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CORRECTIONS AND EMENDATIONS OF THE SECOND EDITION OF SARGENT'S MANUAL OF THE TREES OF NORTH AMERICA

C. S. SARGENT

In the preparation of this long list of corrections in the second edition of my Manual of the Trees of North America, Boston, 1921, I am greatly indebted for help given me by Dr. R. M. Harper of Florida, T. G. Harbison of North Carolina, Professor R. S. Cocks of Louisiana, Professor John W. Harshberger of Philadelphia, C. C. Deam of Indiana, Dr. Robert Ridgway of Illinois, E. J. Palmer of Missouri, and Miss Alice Eastwood of San Francisco.

TABLE OF CONTENTS.

Page ix, *for* Monocotyledons *and* Dicotyledons *read* Monocotyledones and Dicotyledones

SYNOPSIS

Page xi, for **MONOCOTYLEDONS** and **DICOTYLEDONS** read **MONOCOTYLEDONES** and **DICOTYLEDONES**

line 1 of Division ii, *for* or *read* and

Page xii, for **Anonaceae** read **Annonaceae**

Page xiii, for **Malpigiaceae** read **Malpighiaceae**

Page xiv, in lviii, for **Styraceae** read **Styracaceae** and after 4 and 6 insert hyphens

line 2 from bottom, insert a hyphen after 4

Page xv, in lxv, line 1, insert a hyphen after 4

ANALYTICAL KEY

Page xvi, line 2, for **Monocotyledons** read **Monocotyledones**

Page xvii, for **Thuya** read **Thuja** and for **Dicotyledons** read **Dicotyledones**

Page xx, for **Ceanothus spinosos** read **Ceanothus spinosus**

Page xxi, for **Anona** read **Annona**

Pinus Strobus

Page 3, line 3 from bottom, *for* northern Indiana *read* central Indiana

Pinus cembroides var. **edulis**

Page 10, line 17, *for* Lorimer *read* Larimer

Pinus caribaea

Page 15, BEFORE *Pinus heterophylla* Sudw. ADD AS A SYNONYM *Pinus Elliottii* Engelm.

Pinus palustris

Page 15, line 11, *for* $^1/_{16}'$–$^1/_2'$ *read* $'^1/_6$–$^1/_2'$
line 24, *after* Counties) *insert:* ranging inland in Georgia to the neighborhood of Cartersville and Rome, and ascending to altitudes of 1900 feet on the Blue Ridge in Alabama; and

Page 16, line 7, *for* **Bark** $^3/_4'$–$^1/_2'$ *read* **Bark** $^3/_4'$–$1^1/_2'$

Pinus taeda

Page 17, line 16–18, *for* to the shores of Indian River and Tampa Bay, Florida *read* to near Palatka, Putnam County, in eastern Florida, and in western Florida to the neighborhood of San Antonio, Pasco County
line 23, *after* Mississippi *insert:* in Georgia and Alabama sometimes ascending to altitudes of 1500 feet;

Pinus rigida var. **serotina**

Page 18, line 2 from bottom, *after* Florida *add:* (near Kissimee, Osceola County)

Pinus Banksiana

Page 25, line 17, *for* Harshburger *read* Harshberger

Pinus glabra

Page 26, line 2, *for* eastern and southwestern *read* east central
line 3, *for* northeastern *read* southeastern

Pinus virginiana

Page 27, line 17, *after* New Jersey *insert:* west of the Pine barren region

Pinus clausa

Page 28, line 24, *for* Creek *read* River

Pinus pungens

Page 30, line 9, *for* 3000° *read* 4000°

Picea pungens

Page 39, line 9 from bottom, *for* Englm. *read* Engelm.

Tsuga caroliniana

Page 45, line 13, *for* 3000° *read* 4000°

ABIES

Page 51, for **A. balsamifera** in key read **A. balsamea**

Abies balsamea

Page 53, line 24, *for* (var. *hudsonica* Englm.) *read* (var. *hudsonia* Sarg.)

Abies lasiocarpa

Page 54, line 5, *after* New Mexico. *add:* This southern form is now often considered a species as *Abies arizonica* Merr.

Abies magnifica

Page 59, line 7 from bottom, for *xancocarpa* read *xanthocarpa*

Taxodium distichum

Page 65, line 5, *after* strong *insert:* very durable
line 18, *for* Sarg. *read* Croom

Taxodium distichum var. *imbricarium* is now usually and rightly considered a distinct species for which the correct name is *Taxodium ascendens* Brong.; the extension of its range into western Louisiana is not supported by specimens.

Libocedrus decurrens

Page 66, last line but one, *omit:* hardy and
last line, *after* states *add:* ; hardy in the Arnold Arboretum.

Chamaecyparis thyoides

Page 76, line 20, *omit* only *and for* southwestern *read* southeastern

Juniperus utahensis

Page 83, line 19, for *megalacocarpa* read *megalocarpa*

Juniperus virginiana

Page 88, line 8 from bottom, *after* woodenware *add:* , and now for lead pencils

Juniperus lucayana

Page 89, line 6 from bottom, *for* Milano, Milano County, *read* Milano, Milam County

Thrinax Wendlandiana

Page 99, line 4, *for* Hummock *read* Hammock

Coccothrinax

Page 100, line 6 from bottom, *for* stemless *read* often stemless northward

Sabal Palmetto

Page 103, line 17, *for* Metacomb *read* Matecumbe *and change semicolon to a period*

Sabal texana

Page 104, line 1, *change* on the Bernado River *to* of the Bernado River

Acoelorraphe

Page 105, add as a synonym: *Paurotia* Cooke.

Acoelorraphe Wrightii

Page 106, add as a synonym: *Paurotia Wrightii* Britt.

Roystonea

Page 107, line 16, *for* formed by the densely imbricated sheaths of the leaf-stalks *read* formed by the closely appressed sheath of the lowest leaf.

DICOTYLEDONS

Page 118, *for* DICOTYLEDONS *read* DICOTYLEDONES
line 8 from bottom, *for* or *read* and

Populus tremuloides

Page 121, line 4 from bottom, *for* infertile *read* fertile

Populus grandidentata

Page 123, line 4, *for* **Michex.** *read* **Michx.**

Populus heterophylla

Page 125, line 10, *add* eastern *before* Arkansas
line 11, *for* and Indiana *read* , northern Indiana (Laporte and Wells Counties)

Populus tacamahacca

Page 125, *for* **tacamahacca** *read* **tacamahaca**

Populus trichocarpa

Page 127, line 9, *for* Mátir *read* Mártir

Populus MacDougalli

Page 133, line 1, *for* **McDougallii** read **MacDougalii**

Populus balsamifera

Page 136, line 4, *for* Artisia *read* Artesia
Page 137, line 6, *after* Florida *insert* (valley of the Apalachicola River)

Salix Bonplandiana var. **Toumeyi**

Page 146, line 7, *for* Sicamore *read* Sycamore

Salix longipes

Page 148, line 19, *for* Tishamingo *read* Tishomingo

Salix lasiandra

Page 149, *add at top of page*: A tree often 60° in height with a trunk 2°–3° in diameter, or sometimes shrubby, and with straight ascending branches and rather stout branchlets, at first dark purple, reddish brown, or yellow, pilose with scattered hairs or pubescent or tomentose, and often covered by glaucous bloom, becoming dark purple, bright reddish brown or bright orange color. Winter-buds broadly ovate, acute, light chestnut brown and lustrous above the middle, pale at base, and nearly ¼′ in length. Bark ½′–¾′ thick, dark brown, slightly tinged with red, and divided by shallow fissures in broad flat scaly ridges broken by cross fissures into oblong plates.

Salix exigua

Page 152, line 10, *omit* truly

Salix missouriensis

Page 156, line 20, *after* Iowa *insert:* ; and to the neighborhood of Olney, Richland County, Illinois (*R. Ridgway*)

MYRICACEAE

Page 163, line 4 from bottom, *for* waxy exudations *read* wax
Page 164, line 4, FOR *Myrica* rubra Sieb. & Zacc. READ *Myrica rubra* Sieb. & Zucc.

Myrica cerifera

Page 164, line 2 from bottom, *after* diameter, *insert:* or more often a large or small shrub, with

Page 165, line 11, *after* inland *insert:* over the coastal plain of Georgia
line 12, *for* Jackson *read* Adams
line 14, *for* Washita *read* Ouachita

Myrica inodora

Page 166, line 5, *for* Deep swamps *read* Small non-alluvial swamps mostly within fifty miles of the coast *and for* Appalachicola *read* Apalachicola

Juglans

Page 169, line 15, *omit:* (corolla?)

Juglans cinerea

Page 169, *for* **J. cinera** *in key, read* **J. cinerea**

Juglans nigra

Page 172, line 11, *after* Mississippi, *insert* Louisiana,

Juglans major

Page 173, line 15, *for* Banks *read* Near Fort Worth, Tarrant County, Texas (*E. J. Palmer*); and banks

Juglans Hindsii

Page 176, line 2, *for* Mt. Diabolo *read* Mt. Diablo

Carya pecan

Page 177, line 3 from bottom, *for* **Asch. & Gr.** *read* **Engl. & Graebn.**
Page 179, line 3, *for* Marias *read* Marais

Carya cordiformis

Page 181, line 8, *after* Alabama, *insert:* West Feliciana Parish, Louisiana,
line 11, *after* Kansas. *add:* Very common in West Feliciana Parish, and up to 170 feet in height (*R. S. Cocks*).
line 14, *after* Arkansas *insert:* ; Missouri (Richards, Vernon County) and Kansas (Arkansas City, Cowley County)
line 17, *after* Arkansas *insert:* , and near Natchez, Mississippi

Carya aquatica

Page 182, line 22, *for* the valley of the lower Wabash River, *read* southern
line 27, *for* Caloosahatchie River at Alma *read* Caloosahatchee River at Alva and La Belle *and for* Lafayette *read* Dixie

Carya myristicaeformis

Page 183, line 24, *after* southern *add:* and central; *and after* Arkansas *insert:* northward to Faulkner County
line 26, *after* only *add:* near Selma, Alabama, and

Carya ovata

Page 184, line 3 from bottom, *for* Munroe *read* Monroe
Page 185, line 1, *for* bottom *read* bottoms
line 15, *for* Munroe *read* Monroe

Carya carolinae-septentrionalis

Page 185, line 15 from bottom, *for* **Schn.** *read* **Engl. & Graebn.**

Carya laciniosa

Page 186, *for* **Schn.** *read* **Loud.**

Page 187, line 2 from bottom, *for* Munroe *read* Monroe

Carya pallida

Page 190, *for* **Ashe** *read* **Engl. & Graebn.**

Page 191, line 27, *for* northern *read* southern

Carya glabra var. **megacarpa**

Page 193, line 3, *for* Munroe *read* Monroe

line 5, *for* Callusahatchie *read* Caloosahatchee

Carya ovalis var. **obcordata**

Page 195, line 4, *after* Alabama *insert:* and West Feliciana Parish, Louisiana

Carya ovalis var. **odorata**

Page 195, line 15 from bottom, *after* Illinois *insert:* , southeastern Missouri and Heber Springs, Arkansas *and for* Oktibbaha *read* Oktibbeha

Carya ovalis var. **obovalis**

Page 195, line 6 from bottom, *for* Munroe *read* Monroe

line 8 from bottom, *after* Alabama *insert:* , and West Feliciana Parish, Louisiana.

Carya floridana

Page 197, line 5 from bottom, *for* 8′–12′ *read* 8′–12′

Carya Buckleyi var. **villosa**

Page 200, line 9, *after* Missouri *insert:* , to southern Illinois, northern Arkansas and northeastern Oklahoma

Carpinus caroliniana

Page 202, line 21 *before* to the shores *insert* nearly

line 22, *omit:* (Sharpy County);

line 23, *for* Kansas *read* eastern and southern Missouri

Ostrya virginiana

Page 204, line 11, *for* northern *read* central

Betula lenta

Page 206, add as a synonym: *Betula alleghaniensis* Britt.

Betula papyrifera

Page 213, line 22, *after* Michigan *insert:* northern Indiana

Fagus grandifolia

Page 229, line 3 from bottom, *omit:* and northern Missouri *and insert* and *before* Minnesota

line 6 from bottom, *before* valley *insert* Nova Scotia,

Page 230, line 4, *before* Missouri *insert* southeastern

line 6, *for* 3000° *read* 4000° or over

Castanea dentata

Page 232, line 14, *for* Walton *read* Okaloosa, *and after* County) *insert a comma*

Castanea pumila

Page 233, line 24 and 25, *omit:* , and through Arkansas to eastern Oklahoma and southwestern Missouri
line 27, *after* Texas. *add:* In Arkansas, southern Missouri and eastern Oklahoma replaced by *C. ozarkensis* Ashe.

Quercus

Page 238, line 29, *for* Quercus Robur *read* Quercus robur

Quercus borealis

Page 241, line 23, after **Michx.** insert **f.**

Quercus borealis var. **maxima**

Page 243, line 5, *for* 3000 *read* 4000
line 16, for *Porterii* read *Porteri*
line 19, *after* Ohio *add:* and Dumas, Clark County, Missouri

Quercus Shumardii var. **Schneckii**

Page 245, line 6, *after*Kentucky *insert:* , Illinois (Wabash and Pope Counties), Indiana (Wells, Clark, Jennings, Galen and Posey Counties), and Ohio (Franklin and Gallia Counties)

Quercus coccinea

Page 248, line 10, *after* forest. *add:* The var. *tuberculata* from southern Massachusetts to Georgia, Alabama, Tennessee, Indiana, southern Illinois and Missouri.
line 13, for *illicifolia* read *ilicifolia*

Quercus palustris

Page 249, line 9 from bottom, *for* on the coast plain south of the Hudson River *read* in the green sand belt of New Jersey and Delaware

Quercus georgiana

Page 250, line 18, *for* a few other granite hills below the Yellow and Oconee rivers in the region south and east *read* a few other granite or sandstone hills north and southwest

Quercus velutina

Page 251, line 17 from bottom, *after* Pine belt *add:* ; southward often with a more crooked stem and rougher bark (*R. M. Harper*).

Quercus Catesbaei

Page 254, line 1, *for* Creek *read* River
line 4, *for* in the flat woods *read* in dry sandy uplands
line 5, *for* Lake Istokpoga *read* near Fort Ogden
line 6, *after* County *insert:* ; in Georgia inland over the coastal plain to the Pine Mountains, and in Alabama to Tuscaloosa County (*R. M. Harper*)

Quercus Ashei

Page 254, line 11, *for* Charleton *read* Charlton

Quercus rubra

Page 256, line 18, *after* Oklahoma *add*, Arkansas *and for* southwestern *read* southeastern

Quercus marilandica

Page 258, line 2 from bottom, *for* the shores of Matanzas Inlet and Tampa Bay, *read* northern

Page 259, line 10, *omit* at *and after* Carolina *add:* and Fulton, Hempstead County, Arkansas

line 16, *after* Creek County), *add:* Arkansas (Fayetteville, Washington County, Eureka Springs, Carroll County), Missouri (Prosperity, Jasper County),

line 17, *after* Berlin, *insert:* banks of the Alabama River near Selma,

line 18, *for* Levey County *read* Levy County

Quercus arkansana

Page 260, line 19, *after* County, *insert:* and in Clark County, *and for* ; rare and local *read*, east to Pike County, Alabama. By Trelease considered a hybrid of *Q. marilandica* and *Q. nigra*. See paper on *Q. arkansana* by Palmer in Jour. Arnold Arb. vi. 195 (1925).

Quercus rhombica

Page 261, line 16, FOR **Quercus rhombica Sarg.** READ **Quercus obtusata Ashe** AND ADD AS A SYNONYM: *Quercus rhombica* Sarg.

Page 262, line 2, *for* to northern Florida *read* sparingly in Jackson County, west Florida

line 5, for *rhombica* read *obtusata*

line 7, for *rhombica* read *obtusata*

Quercus Phellos

Page 263, line 21, *for* northeastern *read* western (Jackson County)

Quercus laurifolia

Page 264, line 18, *for* falling abruptly *read* many falling gradually

line 19, *after* branches *insert* partly

Page 265, line 8 and 9, *omit:* the shores of Bay Biscayne and

line 9, *for* Caloosahatchie *read* Caloosahatchee

line 10, *for* Istokpaga *read* Istokpoga;

line 16, *before* Louisiana *insert:* and Kisatchie, Natchitoches Parish,

Quercus cinerea

Page 266, line 20, *for* the shores of the Indian River and Peace Creek *read* Fort Myers, Lee County,

line 21, *for* Creek *read* River

line 29, *for* Lincoln *read* Harrison

line 33, *after* Berlin *insert* and near Selma

line 12 from bottom, *for* Milano County *read* Milam County

Quercus imbricaria

Page 268, line 2, *after* North Carolina *add* Bowling Green, Kentucky, *and omit* central and northern
line 3, *omit* southeastern

Quercus Wislizenii

Page 271, line 6 from bottom, *after* County *insert:* , also in Placer, Marin and other counties,

Quercus myrtifolia

Page 272, line 29, *for* Appalachicola *read* Apalachicola

Quercus Durandii

Page 289, line 1, *omit:* and De Soto, Sampson County;
line 2, *for* Muscogee *read* Lowndes *and for* Noxubesco *read* Noxubee
line 6, *for* Nuovo Leon *read* Nuevo Leon
Page 290, lines 23 and 24, *for* peninsular *read* peninsula
line 23, *for* De Soto *read* Highlands

Quercus macrocarpa

Page 291, line 20 from bottom, *omit:* prairies of Caswell County, North Carolina,
line 14 from bottom, *after* Oklahoma *insert:* Caldwell Parish Louisiana (*R. S. Cocks*)

Quercus lyrata

Page 293, line 13, *after* Arkansas. *add*: Three Individuals of this tree in the neighborhood of the town of Amana, Iowa County, Iowa, far north of its known range, are reported by Professor B. Shimek of the University of Iowa (see Bull. Torrey Bot. Club, xliv. 293, t. 16 & 17 [1922]).

Quercus stellata var. **Margaretta**

Page 295, line 6 from bottom, *for* stonolifera *read* stolonifera

Quercus austrina

Page 300, line 12 from bottom, *after* De Soto *omit* Co.

Quercus alba var. **latiloba**

Page 302, line 9, *after* Oak *insert:* ; the var. *repanda* very common in Ponchartrain Parish, Louisiana, and in Richland County, Illinois
last 2 lines, *omit:* and in Richland County, Illinois

Quercus bicolor

Page 303, line 11, *omit:* or rarely scarlet before falling
Page 304, line 16, *for* Munroe *read* Monroe

Quercus montana

Page 305, for **montana L.** read **montana Willd.**
Page 306, line 13, *omit* northern *and after* Alabama *insert:* to Perry and Hale Counties

Page 306, line 15, AFTER (*C. C. Deam*) ADD and on hills near Elberfeld, Warrick County
line 22, for *Q. Robur* read *Q. robur*

Quercus Muehlenbergii

Page 307, line 10 from bottom, *after* Michigan *add:* and western Wisconsin

Ulmus americana

Page 309, add as a synonym: *Ulmus floridana* Chapm.

Ulmus crassifolia

Page 315, line 16, *for* Morehead *read* Moorhead
line 17, *after* County), *insert:* and western Louisiana (very common in Rayville, Natchitoches Parish, (*R. S. Cocks*)

Celtis laevigata

Page 323, line 6 from bottom, *for* K. Koch *read* Willd.
Page 324, line 17, *for* Nuovo Leon *read* Nuevo Leon

Trema mollis

Page 328, line 1, *after* common; *insert:* noticed by R. M. Harper with many specimens in a large dense Palmetto grove a few miles north of Immokalee, Collier County;

Ficus

Page 333, line 4 from bottom, *for* South *read* southern

Magnolia grandiflora

Page 345, last line, *for* little used except for fuel *read* largely used in basket and crate making

Magnolia virginiana var. **australis**

Page 347, line 13 from bottom, *after* Louisiana *add:* and to the neighborhood of Malvern, Hot Spring County, Arkansas (*E. J. Palmer*)

Magnolia tripetala

Page 348, line 10 from bottom, *after* York Counties) *insert:* and Jackson County, Ohio

Liriodendron Tulipifera

Page 352, last line, *add:* A fastigiate form (var. *pyramidata* Lav.) is occasionally cultivated.

Asimina triloba

Page 354, line 11 from bottom, *for* Western *read* northern *and for* (Taylor County) *read* (Clay and Taylor Counties)

Anona

Page 354, for ANONA read ANNONA
Page 355, line 12, for *Cherimolia* read *cherimola*
lines 11, 12, 14, 15, and 16, for *Anona* read *Annona*

Persea palustris

Page 359, line 8, *for* southeastern Virginia (Dismal Swamp) *read* North Carolina

Page 359, line 12, BEFORE Autauga ADD Clay, AND FOR *R. H. Harper* READ *R. M. Harper* AND AFTER *Harper*) ADD: ; very common in Pine barrens of eastern Louisiana (*R. S. Cocks*).

Hamamelis macrophylla

Page 370, line 2 from bottom, *for* Wittlocoochee *read* Withlacoochee
Page 371, line 2, *for* Harding *read* Hardin
Page 373, line 17, *for* western *read* middle *and for* Gladsden *read* Gadsden

Vauquelinia californica

Page 378, line 13, *for* Means *read* Mearns

MALUS

Page 379, line 5, *for* **Hall.** *read* **Miller**

Malus glaucescens

Page 382, line 9, *for* Munroe *read* Monroe

Amelanchier canadensis

Page 395, line 26, *omit* northwestern
Page 402, line 23, *after* Michigan *add:* , and southern Illinois

Crataegus fecunda

Page 405, line 15, *for* St. Claire *read* Claire

Crataegus Palmeri

Page 408, line 11 from bottom, *after* McDonald County *insert:* , to southeastern Kansas and northwestern Arkansas

Crataegus erecta

Page 409, line 13, *omit:* Illinois
line 14, *for* east *read* East *and for* Kahokia *read* Cahokia *and after* Kahokia) *insert:* to Richland County, and southern Illinois and southern Indiana
line 15, *after* Missouri *insert:* , and western and southwestern Arkansas

Crataegus acutifolia

Page 410, line 6, *omit* Illinois
line 7, *for* Kahokia *read* Cahokia *and after* Kahokia) *insert:* , and in Richland County, Illinois, western Tennessee and to the neighborhood of Fayetteville, Arkansas

Crataegus uniqua

Page 413, line 8, *after* Polk County) *insert:* , to southwestern Arkansas

Crataegus Engelmannii

Page 414, line 18, *after* Arkansas *add:* southern Illinois, western Kentucky and Hot Spring and Van Buren Counties, Arkansas.

Crataegus edita

Page 417, line 18, *before* Louisiana *insert:* and to the neighborhood of Shreveport,

Crataegus fastosa

Page 427, line 6 from bottom, *for* Hemstead *read* Hempstead

Crataegus verruculosa

Page 429, line 13, *after* Missouri *insert:* Hot Spring, Garland County, and Hempstead and Miller Counties, Arkansas;

Crataegus aestivalis

Page 435, lines 22 and 24, *for* Valusia *read* Volusia

Crataegus rufula

Page 436, line 22, *for* at midsummer *read* in spring and early summer

Crataegus opaca

Page 437, line 23, *for* Forest *read* Forrest

Crataegus viridis

Page 439, line 15, *after* (Butler County), *add:* southeastern Kansas,

Crataegus glabriuscula

Page 441, last line, *before* Texas *insert:* and in Tarrant County,

Crataegus blanda

Page 442, line 9 and 8 from bottom, *for* near Fulton, Hempstead County, Arkansas *substitute:* ; central Arkansas to the valley of the Brazos River, Texas (Columbia and Brazoria) and to Menden, Louisiana, and Selma, Alabama.

Crataegus velutina

Page 443, line 16, *for* Texacana *read* Texarkana

line 17, *after* Texas *add:* and eastern Louisiana

Crataegus nitida

Page 445, line 23, *after* County *insert:* and to Shawneetown, Gallatin County *and after* Illinois *insert:* to Hannibal, Missouri, and in eastern Arkansas to Helena, Phillips County

Crataegus mitis

Page 446, line 16, *after* County *insert:* and Richland County

Crataegus disjuncta

Page 453, line 7, *after* Missouri *add:* , and to Heber Springs, Cleburne County, and Fayetteville, Washington County, Arkansas

Crataegus lucorum

Page 460, line 19, *for* Thompkins *read* Tompkins

Crataegus mollis

Page 465, line 15, *omit* and *and after* Kansas *insert:* , and Richland County, Illinois

Crataegus invisa

Page 469, line 14, *after* Arkansas *insert:* ; Hugo, Choctaw County, Oklahoma, and to San Augustine, San Augustine County, Texas.

Crataegus induta

Page 477, line 23, *before* Arkansas *add:* to Texarkana, Miller County, and Prescott, Nevada County,

Crataegus quercina

Page 479, line 19, *before* Texas *insert:* Rosenburg and Richmond, Fort Bend County, Wharton, Wharton County, and San Augustine, San Augustine County

Crataegus pyriformis

Page 479, line 20, *for* **Crataegus pyriformis** Britt. *read* **Crataegus dispersa** Ashe

line 21, add as synonym: *Crataegus pyriformis* Britt.

Crataegus lanuginosa

Page 481, line 5, *after* County *add:* , to Gum Springs, Clark County, Arkansas

Crataegus noelensis

Page 488, line 17, *before* Missouri *insert:* and Galena, Stone County *and after* Missouri *add:* and to Rogers, Benton County, Arkansas.

Crataegus pedicellata

Page 495, line 16, *for* Munroe *read* Monroe

Crataegus Holmesiana

Page 496, line 27, *for* Claire *read* Clair

Crataegus acclivis

Page 497, line 11, *for* Munroe *read* Monroe

Crataegus coccinioides

Page 504, line 10, *for* Missouri *read* to southwestern Missouri and to Farmington, Washington County, Arkansas

Crataegus rotundifolia

Page 505, line 6 from bottom, *for* Essex *read* Erie

Crataegus Margaretta

Page 507, line 2, *after* lobes *insert a semicolon and remove comma after* May

Crataegus consanguinea

Page 520, line 10, *for* western *read* middle

Crataegus apiifolia

Page 531, line 15, *for* Lafayette *read* Dixie

Crataegus spathulata

Page 533, line 16, *for* Tanney *read* Taney

Crataegus brachyacantha

Page 534, line 19, *for* Ashtown *read* Ashdown

MACRACANTHAE

Page 535, line 6 in Conspectus, *after* obovate, *insert* fruit

Crataegus Deweyana

Page 540, line 16, *for* Thompkins *read* Tompkins

Crataegus gemmosa

Page 542, line 14, *for* Munroe *read* Monroe

Crataegus macracantha

Page 545, line 13, *for* (Barrington County) *read* (Barrington, Cook County)

Prunus nigra

Page 561, line 14 from bottom, *after* Michigan *insert:* northern Indiana (*C. C. Deam*)

Prunus americana

Page 563, line 7, *for* western *read* middle

Prunus hortulana

Page 568, line 24, *for* Missouri *read* and to northeastern Missouri and southeastern Kansas

Prunus pennsylvanica

Page 571, last line, *after* Michigan *insert:* northern Indiana,

Prunus virginiana

Page 574, line 14, *for* northeastern *read* northern

Prunus virginiana var. **demissa**

Page 574, line 2 from bottom, *after* Iowa *insert:* Stark County, Illinois (*V. H. Chase*), Laporte County, Indiana (*C. C. Deam*),

Prunus australis

Page 578, line 5, *for* Conecut *read* Conecuh

Prunus caroliniana

Page 580, line 8, for *T. B. Harbison* read *T. G. Harbison*

Chrysobalanus icaco

Page 584, line 23, *for* Caloosahatchie *read* Caloosahatchee

Cercis canadensis

Page 604, line 22, *before* western *add* to

Gymnocladus dioicus

Page 607, line 19, *for* southwestern *read* northern and western
line 21, *for* Eastern *read* eastern

Gleditsia triacanthos

Page 609, line 12, *for* western *read* middle *and after* Florida *insert:* (St. Marks, Wakulla County)
line 17, *after* form in *insert:* in Richland County, Illinois, and

Gleditsia texana

Page 609, line 20, add as a synonym *Gleditsia brachycarpa* Nutt., not Pursh

Page 610, line 8, *for* Only in a single grove *read* In a group
line 9, *after* Texas *add*: ; Louisiana, near Shreveport, Caddo Parish (*R. S. Cocks*, 1907); Mississippi, Yazoo City, Yazoo County (*S. M. Tracey*, 1911); Indiana (Knox and Gibson Counties, *J. Schneck*, Plant World, vii. 252 [1904]), Gibson County (*C. C. Deam*, 1921)

Perhaps best considered a hybrid between *G. triacanthos* and *G. aquatica*.

Gleditsia aquatica

Page 611, line 1, *after* states *insert:* except in Alabama
line 3, *for* at La Pointe, Saint Charles County *read* southeastern

Sophora affinis

Page 618, line 20, *for* the valley of the Arkansas River *read* to southwestern

Cladrastis lutea

Page 619, line 5 from bottom, *for* Forsythe *read* Forsyth *and after* Taney County *add* Galena, Stone County *and after* Missouri *add:* , to northern and central Arkansas

Robinia Pseudoacacia

Page 624, line 16, *after* Illinois *add:* and westward to the Ozark region of southern Missouri, Arkansas and Oklahoma
lines 17 and 18, *omit:* perhaps indigenous as a low shrub in northeastern and western Arkansas and in Oklahoma;

Robinia viscosa

Page 626, line 15, *for* 3000 *read* 4000

Ichthyomethia piscipula

Page 630, line 12, *for* commonest of the *read* common
line 14, for Creek read River

MALPIGIACEAE

Page 631, line 5 from bottom, *for* **MALPIGIACEAE** *read* **MALPIGHIACEAE**

Byrsonima lucida

Page 633, line 11, *for* sandy *read* limestone

Bursera Simaruba

Page 647, line 11, *for* Plagida, De Sota County *read* Placida, Charlotte County

Cotinus americanus

Page 658, line 17, *omit:* on the Cheat Mountains, eastern Tennessee;

Metopium toxiferum

Page 659, line 11 from bottom, *after* lenticels *insert:* ; or often a shrub flowering when only a few feet tall.

Rhus typhina

Page 662, line 3, *omit:* to northern Georgia and Mississippi

Rhus copallina

Page 663, line 18, *after* New England *insert:* southward to eastern Kentucky, Tennessee and

Rhus vernix

Page 664, line 10, *for* northern New England to northern Florida and *read* Quebec south to Sebring, Highlands County, Florida (*R. M. Harper*)

Cliftonia monophylla

Page 668, line 15, *for* swamps almost submerged for several months of the year *read* alluvial swamps and bays free from mud, lime, sulphur and salt

Ilex opaca

Page 670, line 7, *for* southern Indiana and Illinois to the shores of the Gulf of Mexico and through Missouri *substitute:* southeastern Missouri and eastern and southern

Ilex Cassine

Page 671, line 4, *for* southeastern Virginia *read* South Carolina

Ilex vomitoria

Page 672, line 6, *after* water *add:* (in Alabama northward to Autauga County)

Ilex decidua

Page 673, line 7 from bottom, *after* southern *add:* and eastern (St. Louis, Pike and Marion Counties) *and after* Illinois *insert:* and southwestern Indiana (common in bottoms, Posey County, *C. C. Deam*)

Evonymus atropurpureus

Page 676, line 14, *after* Tennessee *insert:* and
line 15, *omit:* and western Florida

Page 681, *in key before* **A. spicatum** *insert* 3; *and before* **pennsylvanicum** *insert* **A.**

Acer glabrum

Page 683, line 19, *for* East *read* east

Acer spicatum

Page 686, line 13, *omit:* to northern Georgia

Page 688, line 19 from bottom, for *glabrum* read *glaucum*

Acer saccharum

Page 689, line 18, for *glabrum* read *glaucum*
line 7 from bottom, *after* states *add:* . A form of columnar habit (var. *monumentale* Schwerin) is occasionally cultivated.

Acer floridanum

Page 692, line 14, *for* St. Augustine *read* San Augustine
line 15, FOR *fillipes* READ *villipes* AND FOR Walker READ Wake

Acer saccharinum

Page 695, line 13, *after* 3-lobed *add:* rarely laciniately divided (var. *Wieri* Schwerin)

Page 696, line 17, *after* Florida *insert:* (valley of the Apalachicola River)

Acer rubrum

Page 697, line 8 from bottom, *for* (banks of the Miami River, Dade County, on the east coast and to Cypress Swamps east of Everglade, Lee County, on the west coast) *read* (near the neighborhood of Fort Lauderdale, Broward County, *R. M. Harper*)

Page 697, line 10 from bottom, *after* stocks. *add:* A form of fastigiate habit (var. *columnare* Rehd.) is occasionally cultivated.

Acer rubrum var. tomentosum

Page 698, line 10, *after* Mississippi; *insert:* Crawford and Duvois Counties, Indiana, near Olney, Rutland County, and in Richland, Wayne and Johnson Counties, Illinois;

Acer rubrum var. tridens

Page 699, line 13, *after* Missouri, *add* Arkansas,

Aesculus Pavia

Page 708, line 4 from bottom, *for* Suwanee *read* Suwannee *and for* Lafayette *read* Dixie

line 5 from bottom, *for* western *read* middle

Aesculus discolor

Page 709, line 5 from bottom, *for* Comal Springs, New Braunfels *read* Comal, Comal

Sapindus marginatus

Page 714, line 1, *for* peninsular and Manitee *read* peninsula and Manatee

Sapindus Drummondii

Page 714, line 6 from bottom, *after* Texas *insert:* southern Colorado,

Rhamnus caroliniana

Page 725, line 2 and 3, *omit*: southern Iowa and southeastern Nebraska

line 4, *for* Ardman *read* Carter

Tilia floridana

Page 737, line 10 from bottom, *for* **Ashe** *read* **Small**

Tilia caroliniana

Page 740, line 13, *before* **Tilia caroliniana** *insert:* 9.

Tilia georgiana

Page 748, line 21, *after* Florida *add:* ; Magnet Cove, Hot Spring County, Arkansas (*E. J. Palmer*)

Gordonia Lasianthus

Page 752, line 16, *for* southeastern Virginia *read* South Carolina (Camden, Kershaw County, and Bluffton, Beaufort County)

Gordonia alatamaha

Page 753, line 13, *for* Often *read* Occasionally

Canella Winterana

Page 754, line 8, *for* Munroe *read* Monroe

Creus giganteus

Page 759, line 25, *for* valley of Bill Williams River through central and southern Arizona to the valley of the San Pedro River and to the eastern border of the Colorado Desert between the Needles and Yuma *read* valley of the San Pedro River through central and southern Arizona to the valley of the Colorado River between Needles and Yuma

Rhizophora Mangle

Page 764, line 11 from bottom, *for* Mosquito Inlet *read* Indian River *and for* Cedar Keys *read* shores of Tampa Bay

Conocarpus erecta

Page 767, line 6, *for* Cedar Keys *read* shores of Tampa Bay

Laguncularia racemosa

Page 768, line 12 *for* from Cape Canaveral and Cedar Keys *read* from Manitee County on the west coast and Brevard County on the east coast

Aralia spinosa

Page 778, line 23, after **Club.** *add* **Prickly Ash.**

Nyssa sylvatica

Page 781, line 19 from bottom, *for* southeastern *read* southern

Nyssa ogeche

Page 782, line 2 from bottom, *for* rarely 60°–70° high with 1 or several stems occasionally 2° in diameter *read* usually not more than 30° high with one or several stems 2°–3° in diameter, or often only a shrub, and with

Page 783, line 13, *after* borders *insert:* and ponds *and before* South *insert:* southern

line 14, *for* through the valley of the lower Ogeechee River, Georgia *read* widely and generally distributed in the Altamaha region of eastern Georgia (*R. M. Harper*)

Nyssa aquatica

Page 784, line 11 from bottom, *omit:* and southern

Cornus alternifolia

Page 790, line 18, *after* northern states *insert:* to Iowa and southern Missouri (Monteer, Shannon County)

line 19, *for* northern Alabama *read* Alabama to Covington County

ERICACEAE

Page 791, line 7, for **Lyonia** read **Xolisma**

Kalmia latifolia

Page 795, line 11 from bottom, *for* Martin *read* Clark, Perry

line 2 from bottom, *for* western *read* middle

Oxydendrum arboreum

Page 797, line 5, *for* Norfolk *read* Accomac

Lyonia ferruginea

Page 798, line 1, for **Lyonia ferruginea Nutt.** read **Xolisma ferruginea Hell.**

line 2, for *Xolisma ferruginea* Hell. read *Lyonia ferruginea* Nutt.

Page 799, *for* A *after* 3 *of key read* A

Arbutus texana

Page 801, line 13, *for* Guadaloupe *read* Guadalupe

Vaccinium arboreum

Page 803, line 10 from bottom, *for* Caloosahatchie *read* Caloosahatchee

Jacquinia keyensis

Page 805, line 14 from bottom, *after* soil *insert:* or silicious sand

Ardisia paniculata

Page 806, line 25, for **Ardisia paniculata Nutt.** read **Ardisia escallonioides Cham. & Schlecht.** and add as synonym *Ardisia paniculata* Nutt.

Page 807, line 26, *after* Florida *insert:* usually in low damp hammocks
line 27, *after* coast insert: , ranging northward in the interior to Lake Okeechobee (*R. M. Harper*);

Rapanea guianensis

Page 808, line 8 from bottom, *after* keys *insert;* , ranging in the interior northward to Lake Okeechobee
line 9 from bottom, *after* Florida *insert:* usually in low damp hammocks

Bumelia lanuginosa

Page 814, line 18, *omit:* western
lines 20 and 21, *omit:* (near Mound City, Pulaski County)

Bumelia lycioides

Page 816, line 16, *omit:* western *and after* Arkansas *insert:* (Helena, Phillips County, and McNab, Hempstead County)

Chrysophyllum oliviforme

Page 818, line 2 from bottom, *for* Caloosahatchie *read* Caloosahatchee

Diospyros virginiana

Page 822, line 8 from bottom, *after* In *insert:* southeastern Illinois,

Diospyros texana

Page 824, line 16, *omit* San Saba, Lampasas and *and for* Bexar *read* Brown
line 17, *for* Counties *read* County
line 18, *for* western and southern *read* southwestern

STYRACEAE

Page 824, line 22, for **STYRACEAE** read **STYRACACEAE**

Halesia

Page 825, line 12 *for* is confined to *read* inhabits; *and after* States *add:* and eastern China.

Halesia carolina

Page 826, line 24, *for* and Mount Vernon Counties *read* County to western Kentucky and southern Illinois (near Metropolis, Massac County)

Halesia monticola

Page 827, line 6 and 7, *for* ; Heber Springs, Carroll County, Arkansas *read* to Arkansas and eastern Oklahoma

Halesia diptera

Page 829, line 17, *for* western *read* middle
line 19, *omit:* and to southwestern Arkansas (Miller County)

Styrax grandiflora

Page 829, line 3 from bottom, *for* **grandiflora** *read* **grandifolia**

Symplocos tinctoria

Page 832, line 18 from bottom, *for* usually along the borders of Cypress swamps *read* in hammocks and bluffs

Fraxinus cuspidata

Page 835, line 5, *for* Western *read* western

Fraxinus caroliniana

Page 839, line 5, FOR *R. H.* READ R. M. AND FOR Forest READ Forrest

Fraxinus pauciflora

Page 839, last line, *omit* southern

Fraxinus americana

Page 841, line 6, for *crassifolia* read *subcoriacea*

Page 842, line 11, *after* Nebraska, *add:* Missouri and Arkansas
line 24, *for* Munroe *read* Monroe

Fraxinus biltmoreana

Page 844, line 10, *for* southern *read* northern

Fraxinus nigra

Page 853, line 35, *insert* and *before* central *and change comma after* Iowa *to period and omit line 36*

Chionanthus virginica

Page 856, line 19 from bottom, *after* Pennsylvania *add:* to northeastern Kentucky, and

Osmanthus americanus

Page 858, line 6, *for* in moist soil *read* in hammocks and other places protected from fires
lines 8 and 9, *for* the valley of the Kissimmee River, the interior of the peninsular (Lake and Orange Counties) and *read* Lake and Orange Counties

Cordia Sebestena

Page 860, line 4, *for* Munroe *read* Monroe

Pinckneya pubens

Page 877, line 2, *for* to the valley of the lower Apalachicola River *read* from Leon to Washington County

Guettarda elliptica

Page 880, last line, *before* tree *insert* slender *and after* Florida *insert* in hammocks
Page 881, line 4, *after* leaf-scars *insert:* ; or often a shrub
line 9, *after* Florida *insert:* on the Everglade Keys (Royal Palm Hammock), and

Sambucus Simpsonii

Page 883, line 1, add as synonym: *Sambucus intermedia* Small, not Carrière.
line 3, *after* leaflets, *add* frequently deciduous,

Viburnum prunifolium

Page 890, line 7, *after* Ohio to *insert:* central Michigan,

Page 899, *add* Abies arizonica, 54
for Abies balsamea var. hudsonica *read* Abies balsamea var. hudsonia
add Abies lasiocarpa var. arizonica, 53
add Acer rubrum var. columnare, 698
add Acer saccharinum var. Wieri, 695
for Acer saccharum var. glabrum *read* Acer saccharum var. glaucum
add Acer saccharum var. monumentale, 689
for Anona *read* Annona; *for* Anona Cherimolia *read* Annona cherimola
add Ardisia escallonioides, 806
for Ardisia paniculata READ *Ardisia paniculata*

Page 900, ADD *Betula alleghaniensis*, 207

Page 903, *for* Fraxinus americana var. crassifolia *read* Fraxinus americana var. subcoriacea

Page 904, *for* Juniperus utahensis var. megalanocarpa *read* Juniperus utahensis var. megalocarpa
add Liriodendron Tulipifera var. pyramidata, 352
FOR Lyonia ferruginea READ *Lyonia ferruginea*

Page 905, *for* Malpigiaceae *read* Malpighiaceae

Page 906, add *Paurotia*, 105 and *Paurotia Wrightii*, 106
add *Pinus Elliottii*, 15
for Populus McDougallii *read* Populus MacDougalii

Page 907, *for* Populus tacamahacca *read* Populus tacamahaca
add Quercus obtusata, 261
FOR Quercus rhombica READ *Quercus rhombica*

Page 908, *for* Quercus Robur *read* Quercus robur
for Quercus stellata var. Margaretta f. stonolifera *read* Quercus stellata var. Margaretta f. stolonifera

Page 909, add *Sambucus intermedia*, 883
for Styrax grandiflora *read* Styrax grandifolia
insert Taxodium ascendens, 65
FOR Taxodium distichum var. imbricarium READ *Taxodium distichum* var. *imbricarium*

Page 910, for *Tillia pubescens* read *Tilia pubescens*
add *Ulmus floridana*, 309
FOR *Xolisma ferruginea* READ Xolisma ferruginea
OMIT *Zolisma ferruginea*, 798

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM.

ALFRED REHDER

Taxodium ascendens f. nutans, comb. nov.

Cupressus disticha β. *nutans* Aiton, Hort. Kew. III. 372 (1789).
Cupressus disticha β. *pendula* John Miller, Bristol Nurs. 7 (1826), name only.
Taxodium distichum β. *nutans* Sweet, Hort. Brit. 327 (1827).—Loudon, Arb. Brit. IV. 2481, fig. 2336–2338 (1838).—Endlicher, Syn. Conif. 68 (1847).
Schubertia disticha 2. *pendula* H. K. apud Loudon, Hort. Brit. 388 (1830).
Glyptostrobus pendulus Endlicher, Syn. Conif. 71 (1847).—Hooker in Bot. Mag. XCIII. t. 5603 (1866).
Taxodium distichum pendulum s. *nutans* Wenderoth, Pflanz. Bot. Gärt. I. Conif. 48 (1851).
Taxodium sinense Gordon, Pinetum, 309 (1858).
Cuprespinnata disticha pendula, Nelson, Pinac. 62 (1866).
Taxodium distichum pendulum Carrière, Traité Conif. ed. 2, 182 (1867).—Beissner, in Mitteil. Deutsch. Dendr. Ges. XVI. 107, 2 figs. (p. 108, 110) (1907); Handb. Nadelholzk. ed. 2, 467, fig. 114 (1909).—Horsey in Horticulture, ser. 2, III. 446, fig. (1925).
Taxodium adscendens var. *pendulum* Schneider in Silva Tarouca, Uns. Freiland-Nadelh. 274 (1913).

This form of *Taxodium ascendens* Brongn. (*T. distichum* var. *imbricarium* Croom) differs from the type only in its more or less pendulous or recurved ends of the branches and in the also more or less pendulous slenderer branchlets. The illustrations cited show this character very distinctly except Hooker's figure which is of stiffer habit. It was first described by Aiton in 1789 as *Cupressus disticha* var. *nutans*, but this name was applied later under *T. distichum* by Carrière and other authors to a different plant apparently a form of the true *T. distichum* with slenderer and slightly pendent branches.

Pinus tabulaeformis Hort. apud Carrière, Traité Conif. ed. 2, 510 (1867).—Fortune ex Gordon, Pinetum, ed. 2, 241 (1875), as a synon. of ***P. Massoniana.***

Pinus sinensis Mayr, Fremdl. Wald. & Parkb. 349, fig. 113 (1906), in part.—Shaw in Sargent, Pl. Wilson. II. 15 (1914); Gen. Pinus, 60, t. 23, fig. 201–207 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923).—Dallimore & Jackson, Handb. Conif. 451, fig. 99 (1923).
Pinus Cavendishiana Hort. ex Dallimore & Jackson, l.c. (1923), as a synon.
For further synonyms and literature see Shaw in Sargent, Pl. Wilson. II. 15 (1914) under *P. sinensis.*

This Pine has often been confused with *Pinus Massoniana* Lamb. and by many authors has been identified with *P. sinensis* Lamb., but a careful scrutiny of Lambert's description and figure leads to the conclusion that his species is identical with his *P. Massoniana* which was based on a sterile specimen of a tree cultivated in South Africa, whence it was introduced from China. The special habitat of Lambert's *P. sinensis* also is not known as it is based on a Chinese drawing, which, however, was apparently faithfully executed, and there can be little doubt that Lambert's plate

represents the common Pine of southeastern China now generally identified with *P. Massoniana* to which it had been already referred by Parlatore (in De Candolle, Prodr. XVI. pt. II. 389 [1868]). The figure agrees with *P. Massoniana* in its long and very thin leaves in fascicles of two and in the usually stalked cones with flattened unarmed apophyses mostly or partly about as broad as high, while *P. tabulaeformis* Carr. at least in the form of eastern China which was at Lambert's time the only part of China known, differs in its much stouter and shorter leaves sometimes in clusters of three and in the usually sessile cone with more or less raised apophyses distinctly broader than higher at least on the upper part of the cone.

Pinus tabulaeformis Carr. is based on cultivated plants raised from seed introduced about 1862 to England from China. There can be little doubt that this refers to Fortune's introduction of a Pine from Peking of which mention is made in Gardeners' Chronicle of 1863 in a note which reads partly: "Mr. Fortune's Chinese plants.—A portion of these was sold the other day by Mr. Stevens . . . *Pinus Bungeana* . . . ; a Thuja and a Pinus, from the neighborhood of Pekin." I have found no evidence that Fortune himself suggested or published the name *P. tabulaeformis*, though in 1875 the name is quoted in Gordon's Pinetum (p. 241) as *P. tabulaeformis* Fortune under the synonyms of *P. Massoniana*. Fortune himself does not mention this Pine in his Narrative of a journey to the capitals of Japan and China where he describes his visit to Peking in 1861; he only mentions and figures *P. Bungeana*. Carrière, however, must have received the seeds or plants under the name *P. tabulaeformis* as his citation "Hort." shows and probably at the same time a note on the habit of the mature tree in its habitat. On the strength of all this evidence we have to consider the neighborhood of Peking as the type locality of the species and credit it to Carrière who published the first description.

The taking up of Carriere's name makes necessary the following new combination:

Pinus tabulaeformis var. **densata,** comb. nov.

Pinus densata Masters in Jour. Linn. Soc. XXXVII. 417 (1906).—Shaw in Sargent, Pl. Wilson. I. 2 (1911).—Patschke in Bot. Jahrb. XLVIII. 658 (1912).

Pinus prominens Masters in Jour. Linn. Soc. XXXVII. 417 (1906).—Patschke in Bot. Jahrb. XLVIII. 658 (1912).

Pinus sinensis var. *densata* Shaw in Sargent, Pl. Wilson. II. 17 (1914); Gen. Pinus, 60, t. 23, fig. 201 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923).—Dallimore & Jackson, Handb. Conif. 451 (1923).

CHINA: western Szechuan.

Pinus yunnanensis Franch. referred by Shaw as a variety to *P. sinensis* differs considerably from typical *P. tabulaeformis* and is probably best retained as a distinct species; it is easily distinguished by the longer and slenderer leaves prevailingly in fascicles of three, by the usually larger cones with flattened, not or slightly ridged apophyses and with impressed or scarcely elevated umbos and by its less regular habit with the lower branches often distinctly pendulous.

Clematis chiisanensis Nakai var. **carunculosa,** comb. nov.

Clematis alpina var. *carunculosa* Gagnepain in Rev. Hort. 1915, 535, fig. 162.—Mottet, Arb. Arbust. Orn. 18, fig. 4 (1925).

KOREA.

This variety differs from the type chiefly in the peculiar mucronate appendages arising at the base of the sepals from the prominent ribs and forming a kind of involucre at the base of the sepals. The leaves are pubescent above and glabrous beneath and the flowers are yellow flushed purple. The variety was introduced into cultivation from Korea by Maurice L. de Vilmorin in 1908.

Ribes odoratum Wendl. f. **xanthocarpum,** forma nov.

A typo recedit fructu luteo.

Cultivated at the Arnold Arboretum under no. 7960 (plant received in 1907 from D. Desmond, Boston & Maine R. R.); type specimens in herbarium collected May 11, 1912, July 22, 1918 and July 22, 1922.

This yellow-fruited form is not to be confused with the yellow-fruited *R. aureum chrysoccum* Rydb. from which it is easily distinguished by its more vigorous habit, the larger leaves, those of vigorous shoots truncate to subcordate at base, the finely but densely pubescent branchlets, petioles and rhachis of inflorescence and by the longer corolla-tube, 2 to 3 times as long as the sepals.

Exochorda racemosa Rehd. var. **dentata,** var. nov.

Exochorda dentata Hort. Chenault.

A typo recedit ramulis, petiolis, costa foliorum et rhachi racemi tenuiter et sparse villosis, foliis turionum apice distinctius et grossius serratis.

Cultivated at the Arbold Arboretum under no. 7470 (plant received in 1913 from Léon Chenault & fils, Orleans, France); specimens in herbarium collected May 16, 1918, May 18, 1919 and June 8, 1925.

This variety differs from the type which is quite glabrous in the slight pubescence of the young branchlets, petioles, rhachis of the raceme and the midrib of the under side of the leaf and in the coarser serration of the leaves on vigorous shoots. *Exochorda serratifolia* Moore which might be confused with this variety on account of its pubescence, has the leaves sparingly pubescent on the whole under surface, larger, up to 5 cm. broad, and serrate to below the middle and the flowers have about 25 stamens.

Malus brevipes, spec. vel hybr. nov.

Malus floribunda var. *brevipes* Rehder in Jour. Arnold Arb. II. 50 (1920).

When I first described this plant I expressed doubts whether it should be considered a variety of *M. floribunda* but finding no good morphological characters to separate it from that species, I thought it best to consider it a variety. Extended observations, however, have convinced me that it is not very closely related to *M. floribunda* and that it is better to give it specific rank. Unfortunately neither of *M. floribunda* nor of *M. brevipes*

do we know the origin; they have not been found wild and are not known at present in Japanese gardens, though *M. floribunda* is supposed to have been introduced from Japan by Siebold about 1862.

Malus brevipes differs from *M. floribunda* in its more upright stiffer habit, in the closer and sharper serration of the leaves with spreading not accumbent teeth, in the generally ovate-oblong shape of the leaves of the shoots and the shorter petioles, in the smaller paler flowers on shorter pedicels, in the more deeply divided styles and in the larger, slightly angled fruit with deeper scar and harder flesh shrivelling after maturity, not becoming soft and pulpy, and borne on upright or nearly upright pedicels about 1 cm. long. It usually fruits profusely and is particularly distinct in autumn with its upright or nearly upright red fruit.

× **Malus zumi** var. **calocarpa,** comb. nov.

Malus Sieboldii var. *calocarpa* Rehder in Sargent, Pl. Wilson. II. 294 (1915).
Pyrus Sieboldii var. *calocarpa* Bailey in Rhodora, XVIII. 155 (1916); in Bailey, Stand. Cycl. Hort. v. 2874 (1916).

As I stated under the original description, this Crabapple shows some resemblance to *M. zumi* Rehd. which is probably a hybrid between *M. baccata* var. *mandshurica* Schneid. and *M. Sieboldii* var. *arborescens* Rehd. Continued observation of this form have convinced me that it really is more closely related to that hybrid than to *M. Sieboldii* Rehd. It has the same large white flowers and the leaves of the flowering branchlets are often entire as in *M. zumi* or only slightly crenate-serrate, also the serration of the leaves of the shoots is shallower and more crenate and only the upper leaves of the shoots are shallowly lobed, never as deeply as in *M. Sieboldii*. It blooms ten or twelve days earlier than *M. Sieboldii* and about the same time as *M. zumi*. From typical *M. zumi* this variety differs chiefly in the darker red color of the flower buds and in the prevailingly 3–4 styles of its flowers, while *M. zumi* has often five styles; by these characters it approaches *M. Sieboldii*, one of its supposed parents.

Malus Halliana var. **spontanea,** comb. nov.

Malus floribunda var. *spontanea* Makino in Tokyo Bot. Mag. XXIV. 67 (1910).
Malus spontanea Makino, l.c. XXVIII. 295 (1914).

JAPAN: Kyushu Islands.

About six years ago Mr. Wilson brought a living plant of *Malus spontanea* Mak. from Japan which is now growing at this Arboretum and has flowered and fruited. A comparison of the living plant with *M. Halliana* Koehne shows that there are no good morphological characters to separate these two species and that Makino already had recognized its true affinity, when he described it as *M. floribunda* var. *spontanea*, for the plant he considered *M. floribunda* was *M. Halliana*, not *M. floribunda* Sieb. which is unknown in Japan. The variety differs from *M. Halliana* in its denser and stiffer habit, somewhat broader and smaller leaves, slightly smaller flowers pinkish in bud, but white when fully open and in the less deeply colored pedicels and calyx.

If we consider the two plants as belonging to one species, *M. Halliana* must be taken as a cultivated form of *M. spontanea* which is a native of Mt. Kirishima, Kyushu Islands, and the question of the origin of *M. Halliana* is solved. It seems strange, however, that *M. Halliana* should be cultivated in Yunnan, being represented in our herbarium by specimens collected by E. E. Maire and by C. Schneider, though it is not known from any other part of China, nor has it been found wild in China, for Wilson's no. 4172 referred by me (in Sargent. Pl. Wilson. II. 285) to *M. Halliana* is *M. theifera* Rehd. as a re-examination of the specimen has shown.

Malus prunifolia var. **rinki** f. **fastigiata,** forma nov.

A typo varietatis recedit ramis adscendentibus erectis comam columnarem formantibus, pedicellis brevibus 8–16 mm. longis et fructu depresso-globoso.

Cultivated at the Arnold Arboretum under no. 8217 (raised from seed received from U. S. Dept. of Agriculture under no. 17887); specimens in this herbarium collected May 10 and October 5, 1922, and May 14, 1923.

This is a very striking form on account of its erect branches which form a rather narrow columnar head. The tree is now about 5.5 m. tall, branching from near the base, with a crown about 1.8 m. in diameter. The leaves are elliptic, crenate-serrate and quite glabrous at maturity; the flowers are white and about 4 cm. across. The fruit is depressed-globose or sometimes slightly pear-shaped, 1.5–2 cm. high and 1.8–2.4 cm. across, dark purple-red, and borne on stout pedicels 8–16 mm. long; the calyx is scarcely raised, but is usually thickened and gibbous at the base.

According to F. N. Meyer's note accompanying the seed the fruit was bought on the street in Peking (see U. S. Dept. of Agriculture, Bur. Pl. Indust. Bull. CVI. Invent. Seeds Pl. Imp. XII. 57 [1907]).

× **Malus robusta** f. **erecta,** forma nova.

A typo recedit ramis ascendentibus comam angustam fere columnarem formantibus.

Cultivated: Arnold Arboretum under no. 8218 (raised from seed brought in 1904 by C. S. Sargent from Peking); specimens in this herbarium collected May 10 and September 25, 1922.

Like the preceding form this Crabapple assumes a columnar habit, though somewhat looser and not quite as narrow. The tree is now about 6 m. tall and the head about 2 m. in diameter. The leaves are elliptic or ovate-elliptic, 4–7 cm. long, crenate-serrate and nearly glabrous from the beginning except a slight pubescence on the midrib and veins above. The flowers are pure white, 4–4.5 cm. across, on slenderer pedicels 1.5 to 3.5 cm. long and glabrous like the calyx. The fruit is depressed-subglobose, 1.6–2.2 cm. high and 2.1–2.5 cm. across, bright red and often partly yellow, with rather mealy and sweet flesh; the calyx seems to be always present, but is sometimes rather reduced and small.

In the character of the flowers and leaves the tree agrees very well with *M. baccata* Borkh., but the fruit in its persistent calyx shows the influence of *M. prunifolia* Borkh. I therefore have treated it as a form of *M. robusta* Rehd. (*M. baccata* × *prunifolia*).

× **Malus purpurea** var. **aldenhamensis,** comb. nov.

Pyrus Malus aldenhamensis Gibbs in Gard. Chron. ser. 3, LXXII. 110 (1922), name only.—Kew Hand-list Trees & Shrubs, ed. 3, 131 (1925), as var., name only.

SPECIMENS EXAMINED: Arnold Arboretum, from plants cultivated under no. 13220, May 15 and September 8, 1925; Roy. Botanic Gardens, Kew, October 25, 1922 and May 27, 1925 (from plant received from Vicary Gibbs in 1917).

Nothing definite seems to be known of the origin of this handsome Crabapple designated as a chance hybrid by Vicary Gibbs. It shows, however, a great resemblance to × *M. purpurea* Rehder supposed to be a hybrid between *M. pumila* var. *Niedzwetzkyana* Schneid. and × *M. atrosanguinea* Spaeth (*M. Halliana* × *Sieboldii*) and is probably either a seedling of *M. purpurea* or, what seems less likely, another hybrid of *M. pumila* var. *Niedzwetskyana.* From *M. purpurea* it differs chiefly in the broader and thinner more glabrous leaves less reticulate-veined on the under side and somewhat more sharply and coarsely serrate, in the semi-double purple-pink flowers (pomegranate-purple according to Ridgway's Color standards, pl. XII. 71–i), the glabrous or nearly glabrous purple pedicels and calyx and in the somewhat shorter sepals. The fruit is subglobose or depressed-subglobose, 1.7–2 cm. across, deep purple-red, with peristent calyx raised and thickened at base, and is borne on pedicels about 3 cm. long. As it cannot be separated by any strong characters from *M. purpurea* it seems best to treat it as a variety of that hybrid.

× **Malus purpurea** var. **Eleyi,** var. nov.

Pyrus Eleyi Bean in Gard. Chron. ser. 3, LXVIII. 85, fig. 37 (1920).—Anon. in Gard. LXXXVI. 241, fig. (1922).—Anon. in Gard. Chron. ser. 3, LXXII. 211, fig. 87 (1922).—Anon. in Gard. LXXXVI. 537, fig. (1922).—Eley, Gardening XXth Cent. 115, 2 t. (1923).—Anon. in Gard. LXXXVIII. 81, fig. (1924).—Macself, Flow. Trees & Shrubs, frontispiece (1924).

Malus Eleyi Hesse, Preisliste 1925/26, p. 95 (1925).

This handsome hybrid is according to Bean and Eley a hybrid of *M. pumila* var. *Niedzwetskyana* Schneid. and *M. spectabilis* Borkh. with the former as the seed-bearer, but I am unable to see any influence of *M. spectabilis* in the plant. The plant differs from either parent in its more sharply and deeply serrate leaves and in the smaller flowers with narrower petals; the fruit is scarcely larger than that of *M. spectabilis* and the occasionally deciduous calyx points toward the influence of a species with deciduous calyx. Moreover, young free growing grafts received from Kew have produced in this Arboretum some lobed leaves similar to those of *M. Sieboldii.* This and the occasionally deciduous calyx make it probable that *M. Sieboldii* or a related species or hybrid of that species is the other

parent; also the great resemblance of this plant to *M. purpurea* which is of similar parentage points that way and therefore it seems best to refer it to *M. purpurea;* in its leaves it resembles the preceding variety, but the flowers are single and the fruits ovoid or ellipsoid with the calyx occasionally deciduous.

Pyrus Calleryana Dcne. var. **lanceata,** var. nov.

A typo recedit foliis ovato- vel oblongo-lanceolatis lanceolatisve minutissime crenulatis vel subintegris vel integris.

EASTERN CHINA. Anwhei: Shi tai hsien, *A. N. Steward,* August, 1924, Herb. Univ. Nanking no. 5486 (shrub 4 m.; fruit brown, spotted, edible; type); Yu ting, *N. K. Ip,* August 24, 1923, Herb. Univ. Nanking, no. 4800 (tree, 10–20 ft.). Chekiang: alt. 1900 ft., open thickets, *R. C. Ching,* no. 2585, September 4, 1924 (shrub 20 ft.).

This is a well-marked variety and at the first glance looks like a distinct species, but the 2-celled fruit agrees exactly with that of *Pyrus Calleryana* and the differences in the leaves do not seem strong enough to base a new species upon them, though I have seen among the copious herbarium material before me from almost all parts of China and from Korea no specimen of intermediate character. They all have broad, rather abruptly acuminate, distinctly crenate leaves, while the leaves of this variety are ovate-lanceolate to lanceolate, 4–8 cm. long and 1.5–3 cm. broad, gradually acuminate, narrowed toward the rounded or broad-cuneate base, minutely crenulate as in most leaves of Steward's no. 5486, or entire or nearly entire in Ip's no. 4800 and in Ching's no. 2585. The fruits are 1.2–1.4 cm. across in Steward's specimen and smaller and borne on slenderer pedicels about 4 cm. long in Ching's specimen.

× **Pyrus Lecontei** (*P. communis* × *serotina*), nom. nov.

"Le Conte Pear" Anon. in Rep. Georgia Hort. Soc. VIII. 29 (1878).—Hedrick, Pears of N. Y. 187, t. (1921).

"Kieffer Pear" Meehan in Gard. Monthly, XXII. 49, fig. (1880).—Anon. in Country Gentleman, LXXXIV. 26, fig. (1919).—Hedrick, Pears of N. Y. 180, t. (1921).

"Garber Pear" Anon. in Am. Pomol. Soc. Cat. 48 (1891).—Hedrick, Pears of N. Y. 187 (1921).

The three Pears mentioned above are the best known of the hybrids between the Chinese Sand Pear and the Common Pear and as Le Conte is the oldest it may serve as the type of this group of hybrids, and *P. Lecontei* may be proposed as a name for the group in honor of Major Le Conte who probably raised it some time before 1850. The Kieffer Pear was raised by Peter Kieffer of Roxborough near Philadelphia some time after 1853 and bore fruit first in 1863. The Garber Pear was raised by J. B. Garber of Columbia, Pennsylvania, sometime previous to 1880. As these Pears are described in detail by Hedrick (l.c.) and the first two varieties illustrated by excellent colored plates, it does not seem necessary to give a description here.

Stranvaesia Davidiana var. **salicifolia,** var. nov.

Stranvaesia salicifolia Hutchinson in Bot. Mag. CXLVI. t. 8862 (1920).

CHINA. Hupeh: north and south of Ichang, alt. 1300–2000 m., *E. H. Wilson,* no. 382a (in herb. Arnold Arboretum), October, 1907; Lung men ho, alt. 2000 m., *W. Y. Chun,* August 23, 1922. Yunnan: without precise locality, *G. Forrest,* no. 17990, in 1917–19.

This plant is closely related to *S. Davidiana* var. *undulata* Rehd. & Wils. and differs chiefly in its narrower leaves with usually more numerous veins and—according to Hutchinson—red, not orange fruit, but these characters do not seem to be sufficient to separate this form as a distinct species and I therefore consider it best to reduce *S. salicifolia* to varietal rank as a second variety of *S. Davidiana* Dcne. I cannot follow Cardot (in Bull. Mus. Hist. Nat. Paris, XXV. 399 [1919]) and Stapf (in Bot. Mag. CXLIX. t. 9008 [1924]) in referring *S. Davidiana* to the genus Photinia. In *S. Davidiana* the upper part of the ovary is free in the fruit to the middle or below the middle, in the type as well as in the varieties, and I have not seen a fruit with the ovary free only at the top as figured by Stapf in Botanical Magazine. At full maturity the ovary is easily separated from the fleshy receptacle and the valves split loculicidally and at the same time break into smaller parts by horizontal cracks as I observed in Wilson's no. 382a. Moreover, *S. Davidiana* has 5 styles like *S. nussia* Dcne., while Photinia has only 2 or 3, very rarely 5 styles.

Rubus ulmifolius Schott var. **variegatus,** nom. nov.

Rubus ulmifolius foliis variegatis Nicholson in Kew Hand-list, ed. 2, 265 (1902), name only.—Bean, Trees & Shrubs Brit. Isles, II. 470 (1914).

A handsome form with the leaves variegated with bright yellow along the veins. Whether *R. fruticosus* 4. *variegatus* Weston (Bot. Univ. I. 341 [1770]) and *R. fruticosus* 5. *foliis variegatis* Loudon (Arb. Brit. II. 742 [1838]) belong here, I am unable to say.

× **Rubus Fraseri** (*R. odoratus* × *parviflorus*), nom. nov.

Rubus robustus G. Fraser in Gard. Chron. ser. 3, LXXIII. 51 fig. 24 (1923).—Not Presl.

This hybrid was raised by George Fraser of Ucluelet, British Columbia, from seed of *R. parviflorus* fertilized in 1918 with pollen of *R. odoratus.* It is a compact shrub with rose-colored, fragrant flowers fading to pale purple; from *R. odoratus* L. it differs in its less glandular-pubescent leaves, petioles and stems and in its lighter colored flowers, and from *R. parviflorus* Nutt. in the more acuminate lobes and the narrower basal sinus of the leaves and in the rose-colored flowers.

Prunus Petunnikowi, comb. nov.

Amygdalus Petunnikowi Litvinof in Trav. Mus. Bot. Acad. Sci. St. Petersb. I. 16 (Flor. Turkest. Fragm. 5) (1902).

A plant of this interesting and rare Almond was received in 1912 from the nursery of L. Spaeth, Berlin, Germany, but it has not yet flowered here,

though is it still alive; at Spaeth's nursery it has since died, as I have been informed upon inquiry.

Litvinof compares this species with *Amygdalus nana* L. and *A. paniculata* Pall. (apparently a misprint for *A. pedunculata* Pall.), and distinguishes it chiefly by the oblong fruit and the rostrate-apiculate oblique base of the stone, but in the absence of flowers its exact position remains uncertain. From these species, both of which are growing in this Arboretum, our plant differs in the pale yellowish color of the young branchlets and besides from *P. pedunculata* (Pall.) Maxim. in the narrower leaves with gradually decurrent base; in its leaves it closely resembles *P. nana* (L.) Stokes, but they are more distinctly oblanceolate, smaller, even on vigorous shoots not more than 3 cm. long, less pale beneath and of thinner texture.

Glochidion dasyphyllum K. Koch, Hort. Dendr. 85 (1853).

Glochidion molle Hooker & Arnott, Bot. Voy. Beechey, 210 (1830).—Bentham, Fl. Hongk. 314 (1861).—Non Blume.

Bradleia mollis Steudel, Nomencl. Bot. ed. 2, 222 (1841).

Glochidion Arnottianum Mueller Arg. in Linnaea, XXXII. 60 (1863).—Hemsley in Jour. Linn. Soc. XXVI. 424 (1894).

Phyllanthus Arnottianus Mueller Arg. in De Candolle, Prodr. XV. pt. II. 279 (1866).—Hance in Jour. Linn. Soc. XIII. 120 (1873).

EASTERN CHINA, FORMOSA, HAINAN.

The new names and new combination published by K. Koch in his *Hortus dendrologicus* which appeared in 1853 seems to have been entirely overlooked in botanical literature. I have already in an earlier part of this Journal (IV. 250) referred to the fact that *Hedera nepalensis* K. Koch should supersede *H. himalaica* Tobler and now I wish to draw attention to *Glochidion dasyphyllum* which has priority of *G. Arnottianum*.

One of the reasons that Koch's publication has been neglected until recently is probably the absence of its new names from Index kewensis, but Mr. Sprague informed me, when I drew his attention to Koch's work that these names will be incorporated in the seventh Supplement of Index kewensis.

Evonymus radicans var. **acuta** f. **colorata**, forma nov.

A forma juvenili typi varietatis recedit foliis latioribus, late ellipticis vel ovato-ellipticis, distinctius serratis autumno et per hiemem colore purpureo gaudentibus.

Cultivated in the Arnold Arboretum under no. 19357 (plant received in 1917 from U. S. Department of Agriculture under no. 37541); specimen in herbarium collected December 22, 1925.

This form of *E. radicans* Miq. differs from other evergreen species and varieties of Evonymus in the purple color the leaves assume in autumn and retain during the winter, the upper surface changing to a deep almost blackish purple color and the lower surface to a lighter and brighter purple. The plant in this Arboretum has not outgrown its juvenile stage and its long prostrate branches cover the ground and form a dense mat. The

plant was originally raised from seed collected by F. N. Meyer at Ya tze ko, south of Sian fu, Shensi; the original specimen, Meyer's no. 1694 collected Jan. 22, 1914, which is before me, does not seem to differ from typical *E. radicans* var. *acuta* Rehd. and is described as a woody vine on tree trunks and walls. From this it appears that our plant is apparently a form of the variety common in China and perhaps only a juvenile state, but as it possesses chiefly on account of its purple winter color decided ornamental merits, it deserves, for horticultural purposes at least, a distinct name. The juvenile form grown at this Arboretum under no. 7219 and raised from Wilson's no. 562a collected at Fang Hsien, Hupeh, differs from *E. radicans colorata* in the narrower less prominently serrate leaves remaining green during the winter, but it has the same prostrate habit and in summer appears to be scarcely different.

Evonymus Bungeana f. pendula, forma nov.

A typo recedit ramis ramulisque pendentibus.

Cultivated at the Arnold Arboretum under no. 8025 (received from the Park Dept. of Rochester, New York, whence it came from Spaeth's Nursery, Berlin, Germany, prior to 1904); specimen in herbarium: Rochester Park, N. Y., *J. Dunbar*, October, 1904.

This form differs in its slender pendulous branches from the type; its leaves are rather large, including the long and slender acumen up to 9 cm. long and up to 4.8 cm. broad, and borne on slender petioles up to 4 cm. long.

Vitis Kaempferi var. **glabrescens,** comb. nov.

Vitis Coignetiae var. *glabrescens* Nakai in Tokyo Bot. Mag. XXXII. 108 (1918).

KOREA: Dagelet Island (Ōoryongto).

The very young leaves of this variety are fairly densely covered with a cobwebby tomentum which, however, soon is reduced to a very slight and thin covering of tomentum or retained only along the veins and veinlets. Specimens from Sapporo received from the Agricultural College of Sapporo in 1885 and also some specimens from European and American gardens seem to be identical with specimens of the Dagelet plant collected in 1917 by E. H. Wilson (nos. 8536, 8555); apparently this variety is not restricted to the Dagelet Islands. Nakai (l.c.) states that the variety in its extreme glabrous forms approaches *Vitis amurensis* Rupr., but the latter species differs in the entire absence of cobwebby tomentum, even on very young leaves which are at most covered only on the veins and veinlets with short-pilose hairs, and in the generally smaller leaves with a usually wide sinus.

Vitis Kaempferi K. Koch (Hort. Dendrol. 47 [1853]) is another of the names published by K. Koch in his Hortus dendrologicus and overlooked by later authors, like *Glochidion dasyphyllum* referred to above (p. 30 which see for further remarks). It is apparently the same species as named later *V. Coignetiae* by Pulliat. Koch based his species on *V. Labrusca* Thunb. which judging from Thunberg's description of the leaves as "sub-

triloba" is identical with *V. Coignetiae* rather than with *V. Thunbergii* Sieb. & Zucc. to which it has been, at least partly, referred by some authors; also "folia subtus ferrugineo-tomentosa" fits *V. Coignetiae* better than *V. Thunbergii*. Moreover, Koch enumerates *V. Thunbergii* as *V. ficifolia β. Thunbergii* (Sieb. & Zucc.) which shows that he considered *V. Labrusca* Thunb. to be his *V. Kaempferi*, and not *V. Thunbergii*.

Tilia glabra f. macrophylla, comb. nov.

Tilia nigra var. *macrophylla* Bayer in Verh. Zool.-Bot. Ges. Wien, XII. 53 (1862).
Tilia americana 3. *laxiflora* Kirchner in Petzold & Kirchner, Arb. Muscav. 195 (1864).—Jaeger, Ziergeh. 541 (1865).—Probably not *T. laxiflora* Michx.
Tilia americana 3 f. *macrophylla* V. Engler, Monog. Tilia, 139 (1909).
Tilia macrophylla Hort. ex V. Engler, l. c. (1909), as synon.—Neither Mérat, nor Kirchner.

This form differs from the type chiefly in its very large leaves and is found in gardens under various names of uncertain application. Bayer's name is based on a specimen in the St. Petersburg Herbarium and is described as a form with very large leaves and loose inflorescence. It is probably not the *T. macrophylla* Mérat (Nouv. Fl. Paris, ed. 3, II. 451 [1834]; ed. 4, II. 552 [1836]), erroneously referred to *T. heterophylla* by Simonkai who confused it with *T. macrophylla* Hort. cited by Spach (in Am. Sci. Nat. ser. 2, II. 345 [1834]) as a synonym of *T. heterophylla*, but according to Mérat's description his *T. macrophylla* is glabrous on both sides. Spach's *T. macrophylla*, however, may be the same as *T. macrophylla* Hort. apud Kirchner (l.c. 160).

Tilia glabra f. dentata, comb. nov.

Tilia longifolia dentata Hort. apud Kirchner in Petzold & Kirchner, Arb. Muscav. 160 (1864).—V. Engler, Monog. Tilia, 139 (1907), as synon. of var. *megalodonta*.
Tilia nigra 2b *incisa* Kuntze, Taschenfl. Leipzig, 210 (1867).
Tilia americana megalodonta V. Engler, Monog. Tilia, 139 (1909).—Spaeth in Moeller's Deutsch. Gartn.-Zeit. XXXIX. 274, fig. 2 (1924), habit figure.
Tilia incisa-dentata Hort. in part. ex V. Engler, l. c. (1909), as synon.

This form differs from the type in its rather larger deeply and incisely often nearly doubly serrate leaves and is intermediate between the type and the following form. Of the plant cultivated as *T. longifolia dentata* I have before me two specimens: one collected in 1875 at Muenden, Hannover, from a plant obtained in 1871 from the Booth Nursery, Flottbeck, Germany, and one collected in 1888 by me at Muskau, Silesia, from a plant which without doubt was propagated from the plant in the Muskau Arboretum described by Kirchner.

Tilia glabra f. ampelophylla, comb. nov.

Tilia americana f. *ampelophylla* V. Engler, Monog. Tilia, 140 (1909).
Tilia longidentata hort. pp. ex Engler, l. c. (1909), as synon.
Tilia nigro-longifolia dentata hort. pp. ex Engler, l. c. (1909), as synon.
Tilia longifolia dentata hort. pp. ex Engler, l. c. (1909), as synon.
Tilia incisodentata hort. pp. ex Engler, l. c. (1909), as synon.
Tilia americana var. *densiflora* f. *oenophylla* V. Engler in sched. ex V. Engler, l. c. (1909), as synon.

A form with large leaves coarsely and deeply serrate and furnished on each side with one to three triangular lobes.

Rhododendron carolinianum var. **foliatum,** var. nov.

A typo recedit corolla extus magis lepidota, labio superiore intus maculata, floribus post foliorum ortum apertis, foliis plerumque angustioribus longioribusque et saepe acuminatis, habitu altiore, quibus characteribus ad *R. minus* accedens, sed corolla rotato-campanulata nec basin versus in tubum cylindricum attenuata facile distinguitur.

North Carolina. Macon County: along trail to Wildcat Ridge, near Highlands, *H. H. Richardson,* June 14, 1923; near Highlands, alt. 3950 ft., *T. G. Harbison,* no. 656a, July 2, 1911 and no. 47, June 14, 1918; "Cornelcroft" alt. 3300 ft., *H. H. Richardson,* June 12, 1923; Macon County, alt. 3000 ft., *T. G. Harbison,* no. 202 and 203, June 8, 1919.

This variety differs from the type in its higher stature and looser habit, in the usually narrower and longer often acuminate leaves and usually less densely lepidote beneath and in the generally somewhat smaller corolla more scaly outside and its upper lip marked inside with a blotch of olive green or greenish orange dots; the flowers appear after the leaves and are often overtopped by the leafy shoots. It occurs at altitudes of from 3000 to 4500 ft. and is probably more common than the type which seems restricted to altitudes above 4000 ft.

It has been in cultivation since a long time, for there is an old plant, at least 40 years old, of this form on the old Parkman estate which now belongs to the Boston park system. In recent years it has been frequently distributed by nurserymen as *R. carolinianum,* as it grows in more easily accessible localities, but as an ornamental plant it is inferior to the type which is of more compact habit, blooms earlier and has larger flowers borne well above the foliage.

× **Rhododendron pulchrum** var. **phoeniceum,** comb. nov.

Rhododendron indicum γ *phoeniceum* Sweet, Brit. Flow. Gard. ser. 2, II. sub t. 128 (1832).

Rhododendron phoeniceum G. Don, Gen. Syst. III. 848 (1834).—Wilson in Wilson & Rehder, Monog. Azaleas, 61 (1921), where further citations of literature and synonyms will be found.

If *Rhododendron pulchrum* Sweet and *R. phoeniceum* G. Don which probably both are hybrids of *R. mucronatum* G. Don and *R. scabrum* G. Don are to be united under one binomial, the latter should be *R. pulchrum* which was published in 1832, while *R. phoeniceum* did not receive the rank of a species until 1834, though it appeared as a variety in 1832. Therefore *R. phoeniceum* will have to be treated as a variety of *R. pulchrum.*

× **Rhododendron pulchrum** var. **calycinum,** com. nov.

Azalea indica calycina Lindley in Paxton, Flow. Gard. II. 169, t. 70 (1852).

Rhododendron calycinum Planchon in Fl. des Serres, IX. 81 (1854); in Rev. Hort. 1854, 65.

Rhododendron phoeniceum var. *calycinum* Wilson in Wilson & Rehder, Monog. Azaleas, 63 (1922), where further citations of literature and synonyms will be found.

This new combination becomes necessary, since *R. pulchrum* has priority of *R. phoeniceum* as stated above.

Syringa tomentella var. **Rehderiana,** comb. nov.

Syringa Rehderiana Schneider in Sargent, Pl. Wilson. II. 299 (1912); Ill. Handb. Laubholzk. II. 1064 (1912).—Rehder in Bailey, Stand. Cycl. Hort. VI. 3302 (1917).

CHINA. Szechuan.

The variety differs from typical *S. tomentella* Bur. & Franch. chiefly in the tomentulose branchlets, the densely short-pilose larger inflorescence and in the leaves being slightly pubescent above and more densely so beneath particularly on the veins. It is doubtful if this variety is in cultivation.

Syringa oblata var. **Giraldii,** comb. nov.

Syringa Giraldi Lemoine, Cat. no. 157, p. 35 (1904); no. 160, p. 30 (1905). – Sprenger in Mitt. Deutsch. Dendr. Ges. XVI. 68 (1907). –Bellair in Rev. Hort. 1909, 335, fig. 135–137. –Lingelsheim in Engler, Pflanzenreich, IV. 243, pt. I–II. 88 (1920), as synon. of *S. oblata* var. *affinis*.

Syringa affinis var. *Giraldi* Schneider, Ill. Handb. Laubholzk. II. 774 (1911). – Rehder in Bailey, Stand. Cycl. Hort. VI. 3301 (1917).

NORTHERN CHINA.

This Lilac is probably the wild form of *S. oblata* Lindl. which is known only as a cultivated plant; it differs from the latter chiefly in its slenderer and looser habit, less compact inflorescence, longer more acuminate capsules, and smaller usually narrower and ovate leaves, truncate at base and finely soft-pubescent on sterile branchlets particularly on those near the base of the shrub and on young plants; on and near flowering branches they are usually quite glabrous as in typical *S. oblata*. On older plants pubescent leaves may be entirely absent or the pubescence may be reduced to a ciliate margin. A similar behavior can be observed in *S. vulgaris* which is usually entirely glabrous and only on wild plants ciliate leaves occasionally occur.

Syringa oblata var. **dilatata,** var. nov.

Syringa dilatata Nakai in Tokyo Bot. Mag. XXXII. 128 (1918); Fl. Sylv. Kor. X. 48, t. 18 (1921).

KOREA.

This is very similar to the preceding variety and seems to differ chiefly in the long-acuminate larger and narrower leaves, on vigorous shoots sometimes narrow-ovate, rounded at base and decurrent into the petiole. This variety was introduced to the Arnold Arboretum by E. H. Wilson in 1919.

Campsis radicans f. **flava,** comb. nov.

Tecoma radicans γ *flava* Bosse, Vollst. Handb. Blumengaert. III. 470 (1842). – Mouillefert, Arb. Arbriss. II. 937 (1896).

Tecoma radicans lutea Kirchner in Petzold & Kirchner, Arb. Muse. 519 (1864).—Jaeger & Beissner, Ziergeh. ed. 2, 393 (1884).

Bignonia radicans var. *lutea* Jaeger, Ziergeh. 134 (1865).

Bignonia radicans aurea, Meehan, Cat. XL. 64 (1905).

Campsis radicans var. *aurea* Hort. apud Rehder in Bailey, Stand. Cycl. Hort. II. 685 (1914); in Mitteil. Deutsch. Dendr. Ges. XXIV. (1915) 227 (1916), as forma.

According to Bosse this yellow-flowered form was offered before 1842 by J. Booth at Flottbeck, Germany.

Lonicera Ferdinandi var. **induta,** var. nov.

A typo recedit ramulis dense pube brevi et pilis setosis patentibus vestitis, foliis majoribus basi plerisque truncatis vel subcordatis, supra laxe pubescentibus, subtus dense molliterque praecipue in costa venisque pilosis, corolla pube densiore vestita.—Frutex ut videtur robustus; rami robustiores interdum stipulis semiorbicularibus praeditae. Folia ovato-oblonga, 3.5–8 cm. longa et 1.7–4.5 cm. lata, acuminata, basi truncata, majora saepe subcordata, minora saepius rotundata, supra sparse accumbenti-pilosa, subtus pilis erectis mollibus praecipue in costa et venis venulisque dense obtectis, maturitate interdum costa et basibus venarum exceptis glabrescentibus; petioli 2–5 mm. longi, dense pilosi. Pedicelli petiolis breviores, rarius aequilongi, dense pubescentes; bracteae oblongo-ovatae vel ovatae, circiter 1 cm. longae, margine et ad costam subtus longe setoso-ciliatae, ceterum glabrae vel fere glabrae; cupula dense pubescens et praecipue apicem versus setoso-pilosa; corolla circiter 1.5 cm. longa, extus dense pubescens glandulis sparsis immixtis, apice sparse setoso-pilosa, tubo basi leviter ventricoso et pilis setosis brevibus reflexis instructo. Baccae fere ad maturitatem in cupula inclusae, maturitate erumpentes, rubrae.

NORTHERN CHINA. S h a n s i: Sheng shih ling, alt. 1500–2500 m., *Tchuang Kieh*, September 9, 1922, Hers no. 2059 (type); Wen fu ho valley, alt. 1200 m., October 2, 1923, Hers no. 2777. W e s t e r n S h e n s i: Lungchow, Kuan shan, alt. 2000 m., July 3, 1928, Hers no. 2351. H o n a n: cultivated at Chungchow (introduced from the hills), May 1, 1923, Hers no. 2499.

This variety differs in its larger leaves densely soft-pubescent beneath and slightly pubescent above and in the densely pubescent and pilose branchlets from typical *L. Ferdinandi* Franch. and looks quite distinct in its extreme form, but in Hers' no. 2777 the leaves are pubescent only on the lower part of the midrib and of the veins beneath, and otherwise glabrous and young plants raised from seed of Hers' no. 2059 have the leaves glabrous except scattered pilose and setose hairs on midrib and veins beneath and the branchlets densely setose and not pubescent, and the plants thus resemble closely typical *L. Ferdinandi.* Therefore I considered it best in the absence of marked differences in flower and fruit to refer the plant as a variety to that species.

Lonicera trichosantha f. **glabrata,** forma nov.

A typo recedit foliis glabris vel interdum tantum ad costam sparse pilosis, corolla tantum tubo extus puberulo, limbo fere glabro vel glabrescente.

CHINA. W e s t e r n S z e c h u a n: near Tachien lu, thickets, alt. 3000 m., October, 1910, *E. H. Wilson*, no. 856 (type). Y u n n a n: without precise locality, *G. Forrest*, no. 13948. S o u t h e a s t e r n T i b e t: without precise locality, *G. Forrest*, nos. 14296, 19073.—C u l t i v a t e d: Arnold Arboretum under no. 5973 (received from Veitch in 1907 under Wilson no. 1744), August, 1908, August, 1910,

June 15, 1914, August 12, 1916, June 10, 1925; Hort. Veitch (under Wilson. no. 1744), *E. H. Wilson*, August, 1911; Arboretum Roemershof near Riga, Livonia, *M. von Sivers*, 1913; Arboretum Pruhonitz near Prague, Czechoslovakia, under no. 1084 (from seed coll. by E. H. Wilson), *C. Schneider*, 1913.

This form differs from typical *L. trichosantha* Bur. & Franch. (*L. oralis* Batal.) chiefly in its glabrous usually rather larger and very obtuse leaves and in its flower-buds being glabrous toward the apex, while in the type the leaves are pubescent beneath at least on the midrib and veins and the flower-buds pubescent all over.

Lonicera trichosantha f. **acutiuscula,** forma nov.

A typo recedit foliis acutis vel acutiusculis plerisque ellipticis vel anguste ellipticis vel oblongo-ovatis subtus tantum ad costam et venis sparse pilosis vel fere glabris saepius minoribus, et ramis saepe magis elongatis vel fere sarmentosis.

China. Shensi: Tai pei shan, *W. Purdom*, no. 933, 1910. Western Szechuan: Tachien-lu, *E. H. Wilson* (seed only).—Cultivated: Arnold Arboretum under no. 6671 (from seed collected by E. H. Wilson under no. 856b) August 26, 1914, August 22, 1916, August 28, 1917 (type); Arnold Arboretum under no. 19358 (from seed collected by W. Purdom under no. 731), June 5 and August 2, 1916, May 20, 1918; Fruticetum Vilmorin at Les Barres, France, under "semis 4154," *M. L. de Vilmorin*, May 30, 1909.

This variety differs from the type chiefly in its acute or acutish leaves usually smaller and only slightly pubescent or nearly glabrous beneath; it also differs in its usually more diffuse habit with the branches more elongated and flexuose or nearly sarmentose or sometimes partly prostrate. In its extreme form it approaches *L. prostrata* Rehd., but that species is distinctly prostrate, the leaves are still smaller and the flowers borne on longer pedunceles and smaller.

Lonicera deflexicalyx var. **xerocalyx,** var. nov.

Lonicera xerocalyx Diels in Notes Bot. Gard. Edinb. v. 177 (1912).

A typo recedit praecipue foliis anguste lanceolatis ad 10 cm. longis, cupula bracteolarum ovarium plerumque aequans vel paullo superans, calyce majore glabro.

China. Yunnan: Lichiang Range, alt. 3500 m., *G. Forrest*, no. 2386 (type), June, 1906; Lichiang Range, alt. 4000 m. and 3600 m., *C. Schneider* nos. 1801, 2460, July 16 and September 8, 1914.

Lonicera xerocalyx differs from typical *L. deflexicalyx* Batal. only in the longer narrow-lanceolate leaves, the usually larger cupula and larger glabrous calyx, but in Schneider's no. 1801 the cupula is not as high as the ovary and in Purdom's nos. 1089 and 1090 of *L. deflexicalyx* the calyx is fully as large as that of *L. xerocalyx* and glabrous. I therefore cannot consider *L. xerocalyx* specifically distinct and refer it as a variety to *L. deflexicalyx*.

Lonicera japonica var. **repens,** comb. nov.

Lonicera nigra Thunberg, Fl. Jap. 89 (1784).—Not Linnaeus.
Lonicera flexuosa Thunberg in Trans. Linn. Soc. II. 330 (1794).
Xylosteum flexuosum Dumont de Courset, Bot. Cult. ed. 2, VIII. 208 (1814).

Lonicera brachypoda De Candolle, Prodr. IV. 333 (1830).
Caprifolium flexuosum hort. apud Steudel, Nom. Bot. II. 278 (1841).
Lonicera brachypoda var. *β. repens* Hort. Bogor. apud Siebold in Jaarb. Nederl. Maatsch. Anmoed. Tuinb. 1845, 73, t. 7.
Lonicera confusa Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 270 (1866); Prol. Fl. Jap. 158 (1866).—Not De Candolle.
Lonicera diversifolia Carrière in Rev. Hort. 1866, 99.
Lonicera Japonica Chinensis Baker in Ref. Bot. IV. t. 224 (1871), in part.—Not *L. chinensis* Wats.
Lonicera brachypoda repens Lavallé, Arb. Segrez. 140 (1877), name only.
Caprifolium japonicum subverticillare Kuntze, Gen. Pl. I. 273 (1891).
Lonicera japonica var. *flexuosa* Nicholson, Hand-list Arb. Kew. II. 17 (1896).—Rehder in Ann. Rep. Missouri Bot. Gard. XIV, 161 (Syn. Lonicera) (1903).

As "repens" is the oldest varietal name of this Honeysuckle, the new combination proposed here becomes necessary.

× Lonicera Sargentii (*L. hirsuta* × *prolifera*), nom. nov.

Lonicera hirsuta × *Sullivantii* Sargent in Gard. & For. IX. 344, f. 46 (1896).—Rehder in Ann. Rep. Missouri Bot. Gard. XIV. 211 (Syn. Lonicera) (1903).

As this hybrid is still in cultivation and was well figured and described, a binomial may be given to it for convenient reference. It is clearly intermediate between the parents cited above; from *L. hirsuta* Eat. it differs in the less pubescent scarcely or not ciliate leaves, glandless inflorescence, slightly or scarcely pubescent corolla and from *L. prolifera* Rehd. (*L. Sullivantii* Gray) it can be distinguished by the more densely pubescent under side of the leaves and the slightly pilose and darker colored corolla.

THE TAXADS AND CONIFERS OF YUNNAN.

ERNEST H. WILSON

DURING the years 1922–23, Mr. J. F. Rock collecting in Yunnan under the auspices of the National Geographic Society, Washington, D. C., made a large collection of the Taxads and Conifers he met with. A set of these was presented to the herbarium of the Arnold Arboretum. Naming this collection has afforded an opportunity to identify other material in this herbarium collected in Yunnan and enables me to present a review of the TAXACEAE and PINACEAE of the whole province.

Yunnan is interesting as representing the southern limits of distribution of many species of these two families.

TAXACEAE is represented by four genera—Taxus, Podocarpus, Torreya and Cephalotaxus—with eight species of which three belong each to Cephalotaxus and Podocarpus. One species of Cephalotaxus (*Cephalotaxus Mannii* Hook. f.) was first found in Manipur, northern Assam, the other two are widespread in China. One Podocarpus is Indo-Malayan, the other two are doubtful plants of which I have seen no material. The Torreya is found from Hupeh westward whilst the Taxus is widespread in China and grows also in Formosa and the Philippines.

In PINACEAE with fifteen genera Yunnan is richer than any other part of China. To these genera belong 33 species. Of these *Keteleeria Evelyniana* Mast. is doubtfully distinct; *Cryptomeria japonica* D. Don is cultivated only and *Thuja orientalis* L. may be an escape from cultivation and naturalized only. One other (*Fokienia Kawaii* Hayata) is described from the forests of the Tonkin-Yunnan border. *Abies Forrestii* Rogers is endemic and, strange to say, this is probably the only Conifer so far known confined to Yunnan. The most remarkable feature of all is the occurrence in extreme western Yunnan and in Formosa of *Taiwania cryptomerioides* Hayata, *Libocedrus macrolepis* Benth. & Hook. and *Pseudotsuga Wilsoniana* Hayata which are not known to grow elsewhere.

The subfamily ABIETEAE is represented by seven genera in eighteen species of which one (*Keteleeria Evelyniana* Mast.) is doubtful. Of the four species of Pinus two (*Pinus Armandi* Franch. and *P. tabulaeformis* Carr.) are widespread in China and the former grows also in Formosa and on the Japanese islands of Tanega-shima and Yaku-shima. Another (*P. yunnanensis* Franch.) ranges north into the warm valleys of western Szechuan. The fourth (*P. insularis* Endl.), a tropical Indo-Malayan species, finds its northern limits in Yunnan. The tropical *P. Merkusii* Jungh. grows in the bordering regions of upper Burmah and Siam and will probably be found in Yunnan. I have seen no Yunnan specimens of *P. Massoniana* Lamb., the common low-level Pine of China, but feel certain it must grow in that province. Of the two Pseudotsugas, *Pseudotsuga sinensis* Dode has its western limits of distribution in northeastern Yunnan, whilst *P. Wilsoniana* Hayata grows in Formosa and extreme northwest Yunnan. The Larch finds its southern limits in Yunnan as do the two Tsugas. The four species of Picea are also found in Szechuan and belong two to the section Omorica and two to that of Casicta. Curiously enough no Eupicea has yet been found in Yunnan. Two (*Abies Delavayi* Franch. and *A. Beissneriana* Rehd. & Wils.) of the three Abies are common in western Szechuan whilst the third (*A. Forrestii* Rogers) as before stated is endemic.

Of the three genera belonging to the subfamily TAXODIEAE, Cunninghamia is abundant and widespread in the warmer parts of China, Taiwania is confined to Formosa and extreme northwest Yunnan and Cryptomeria is cultivated there as elsewhere outside of Japan proper.

The subfamily CUPRESSEAE is represented by five genera in nine species. Of these *Thuja orientalis* L. may be indigenous or merely naturalized. *Libocedrus macrolepis* Benth. & Hook. grows also in Formosa, but not elsewhere. One Cupressus (*Cupressus Duclouxiana* Hickel) is confined to Yunnan and the warm valleys of western Szechuan, the other (*C. funebris* Endl. is widespread in China. Of the five species of Juniperus two (*Juniperus Wallichiana* Hook. f. and *J. recurva* Buch.-Ham.) are Himalayan and have their western limits in Yunnan. Another (*J. formosana* Hayata) is widespread in China and is found also in Formosa and so too is *J.*

squamata Buch.-Ham. which extends westward to the Sikkim Himalayas. The fifth (*J. chinensis* L.) though widespread throughout China and north-eastern Asia generally is doubtfully indigenous in Yunnan.

TAXACEAE

Cephalotaxus Sieb. & Zucc.

Cephalotaxus Fortunei Hooker in Bot. Mag. LXXVI. t. 4499 (1850).—Parlatore in De Candolle, Prodr. XVI. pt. II. 503 (1868).—Franchet in Nouv. Arch. Mus. Paris, sér, 2, VII. 102 (Pl. David. I. 292) (1884);—in Jour. de Bot. XIII. 265 (1899).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 848 (Pl. Enum. 63) (1891); in Wiss. Ergeb. Reise Szechenyi, II. 738 (1898).—Beissner in Nuov. Giorn. Bot. Ital. n. ser. IV. 186 (1897); in Bull. Soc. Bot. Ital. 1901, 358.—Pritzel in Bot. Jahrb. XXIX. 213 (1900).—Masters in Jour. Linn. Soc. XXVI. 545 (1902); XXXVII. 413 (1906); in Jour. Bot. XLI. 269 (1903).—Pilger in Engler, Pflanzenr. IV.—5, 103 (Taxac.) (1903).—Diels in Wiss. Ergeb. Exped. Filchner China Tibet, X. 247 (1908).—Dunn & Tutcher in Kew Bull. Misc. Inform. add. ser. X. 256 (Fl. Kwangtung & Hongkong) (1912).—Patschke in Bot. Jahrb. XLVIII. 629 (1913).—Rehder & Wilson in Sargent. Pl. Wilson. II. 5 (1914).—Chun, Chinese Economic Trees, 45 (1922).—Rehder in Bailey, Cult. Evergreens, 183 (1923).—Dallimore & Jackson, Handb. Conif. 23, fig. 3 (1923).

Cephalotaxus filiformis Knight & Perry ex Gordon, Pinetum, 46 (1858), as a synonym.

Cephalotaxus drupacea K. Koch, Dendr. II. pt. II. 104 (1873).—Not Siebold & Zuccarini.

Cephalotaxus Griffithii Beissner in Bull. Soc. Bot. Ital. 1901, 358.—Masters in Jour. Bot. XLI. 269 (1903); in Jour. Linn. Soc. XXXVII. 414 (1906).—Not Hooker f.

Cephalotaxus Mannii Masters in Jour. Linn. Soc. XXVI. 545 (1902).—Not Hooker f.

YUNNAN: Between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8150, March, 1923; mountains south of Likiang, Sungkwe Hochin Range, *J. F. Rock*, no. 8298, in 1923; Litiping Range, Mekong-Yangtze divide, east of Weihsi, *J. F. Rock*, nos. 8691, 9397, 10370, 11572, 11575, in 1923; Siaomio-tsin near Pe-yen-tsin, *Siméon Ten*, no. 315, September, 1916; Hoa-Kiao-pin near Pe-yen-tsin, *Siméon Ten*, no. 161, June, 1916; Kou-ty near Pe-yen-tsin, *Siméon Ten*, no. 460, in 1917; Mengtze, mountains to the north, alt. 2300 m., *A. Henry*, no. 9100.

SZECHUAN: Yen-yuan Hsien, alt. 2900 m., *C. Schneider*, no. 3573, May, 1914; between Kalapa and Liuku, alt. 3000–3300 m., *C. Schneider*, no. 1290, May, 1914.

DISTRIBUTION: China, south of the Yellow River at moderate altitudes, from the east coast to the extreme west.

Cephalotaxus Mannii Hooker f. in Hooker's Icon. Pl. XVI. t. 1523 (1886); Fl. Brit. Ind. v. 647 (1888).

YUNNAN: without locality, *G. Forrest*, no. 7798.

DISTRIBUTION: Assam, Khasia mountains eastward to the mountains of southwestern Yunnan.

Forrest's specimen consists of leafy shoots which have subfalcate leaves and agree well with co-type specimens of Hooker's species in this herbarium.

Cephalotaxus drupacea Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 232 (Fl. Jap. Fam. Nat. II. 108) (1846).—Hemsley in Bot. Mag. CXXXV. t. 8235 (1909).—Rehder & Wilson in Sargent, Pl. Wilson. II. 3 (1914), where full synonymy and references are given.

DISTRIBUTION: Japan, south Korea and east China as far west as the province of Hupeh.

I have seen no specimens of typical *C. drupacea* S. & Z. from the province of Yunnan.

Cephalotaxus drupacea var. **sinensis** Rehder & Wilson in Sargent, Pl. Wilson. II. 3 (1914).—Rehder in Jour. Arnold Arb. IV. 118 (1923) where full synonymy and references are given.

YUNNAN: without locality, *G. Forrest*, no. 11683.

DISTRIBUTION: mountains of central and western China from the province of Honan westward.

Forrest's specimen bears young unopened male flowers and is rather fragmentary. This is the only material I have seen of this variety from the province of Yunnan.

Torreya Arn.

Torreya Fargesii Franchet in Jour. de Bot. XIII. 264 (1899).—Pritzel in Bot. Jahrb. XXIX. 214 (1900).—Pilger in Engler, Pflanzenr. IV.-5, 108 (Taxac. (1903).—Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 231 (1910).—Patschke in Bot. Jahrb. XLVIII. 630 (1913).

Torreya grandis Rehder & Wilson in Sargent. Pl. Wilson. II. 7 (1914). Not Fortune.

Tumion fargesii Skeels in Proc. Biol. Soc. Wash. XXXVIII. 88 (1925).

YUNNAN: Between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8144, March, 1923; Litiping Range, Mekong-Yangtsze divide east of Weihsi, *J. F. Rock*, nos. 8692, 9396, 10374, in 1923; same locality, Lienfu, alt. 2400 m., *H. Handel-Mazzetti*, no. 7848, August, 1915; valley of the Salween River, alt. 2500–2700 m., *H. Handel-Mazzetti*, no. 8302, September, 1915.

DISTRIBUTION: western China, mountains of Hupeh, Szechuan and Yunnan.

This species is characterized by its gray, yellowish green bark on shoots

two years old and upwards and by its deeply ruminate endosperm. The east China *T. grandis* Fortune has similar bark but the endosperm is scarcely if at all ruminate. When working up the TAXACEAE for Sargent's Plantae Wilsonianae, my colleague, A. Rehder, and I had seen no ripe fruits of Fortune's species and, moreover, overlooked the illustration in Gardeners' Chronicle, 1858, 588, fig. and confused the two species. With ripe fruits available the differences are perfectly obvious.

Taxus L.

Taxus chinensis Rehder in Jour. Arnold Arb. I. 51 (1919); IV. 119 (1923); in Bailey, Cult. Evergreens, 187 (1923).—Dallimore & Jackson, Handb. Conif. 71 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. 34, fig. (1923).

Taxus baccata Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 103 (Pl. David. I. 293) (1884).—Pritzel in Bot. Jahrb. XXIX. 214 (1900).—Masters in Jour. Linn. Soc. XXVI. 546 (1902); in Jour. Bot. XLI. 269 (1903); in Jour. Linn. Soc. XXXVII. 414 (1906).—Not Linnaeus.

Taxus baccata, subsp. 2. *cuspidata* var. b. *chinensis* Pilger in Engler, Pflanzenr. IV.–5, 112 (Taxac.) (1903).—Patschke in Bot. Jahrb. XLVIII. 630 (1913).—Henry in Elwes & Henry, Trees Gr. Brit. & Irel. I. 108 (1906).

Taxus cuspidata var. *chinensis* Rehder & Wilson in Sargent, Pl. Wilson. II. 8 (1914).

Taxus baccata, subsp. 1. *Wallichiana* var. b. *chinensis* Pilger in Bot. Jahrb. liv. 43 (1916).

Taxus cuspidata Chun, Chin. Econ. Trees, 43, fig. 13 (1922).—Not Siebold & Zuccarini.

YUNNAN: Shweli River drainage basin to summit of Shweli-Salween watershed east of Tengyueh, *J. F. Rock*, no. 7587, November, 1922; Litiping Range, Mekong-Yangtsze divide, east of Weihsi, *J. F. Rock*, no. 11573, in 1923; near Talifu, alt. 3200 m., *H. Handel-Mazzetti*, no. 6408, May, 1915; between Sungyueh and Tengchuan, alt. 3000–3200 m., *C. Schneider*, no. 2918, Sept., 1914; without locality, *G. Forrest*, nos. 9642, 11789 and 12087.

DISTRIBUTION: China, widely spread; also on the mountains of Formosa, Luzon in the Philippine Islands and those of Manipur.

The western limits of the range of this species are not known but very possibly they will prove to be on the Sikkim Himalayas. Dr. Handle-Mazzetti's specimen has been named by him *T. Wallichiana* Zucc., but that species would appear to be confined to the northwestern Himalayas. The several specimens I have seen from Luzon in the Philippines and from Manipur in northern Assam are identical in every way with material from Hupeh and Szechuan. The Chinese Yew with its longer leaves of a cheery green color and very numerous slender branchlets is under cultivation very distinct from either the Japanese or European species.

Podocarpus L'Herit.

Podocarpus neriifolius D. Don in Lambert, Descr. Pinus, II. 21 (1824), in part; ed. minor, 142 (1832).—Hooker in Bot. Mag. XXXVIII. t. 4655 (1852).—Masters in Jour. Linn. Soc. XXVI. 548 (1902); LXXVII. 414 (1906).

—Pilger in Engler, Pflanzenr. IV. 5, 80 (Taxaceae) (1903).—Patschke in Bot. Jahrb. XLVIII. 629 (1913).—Rehder & Wilson in Sargent Pl. Wilson. II. 9 (1914).—Hayata in Tokyo Bot. Mag. XXXI. 119 (1917).

Podocarpus macrophylla Wallich, Tent. Fl. Nepal, 56, t. 43 (1824), excluding synonyms; Cat. No. 6052a (1830).—Franchet in Jour. de Bot. XIII. 265 (1899).—Pritzel in Bot. Jahrb. XXIX. 213 (1900).—Masters in Jour. Linn. Soc. XXVI. 548 (1902).—Patschke in Bot. Jahrb. XLVIII. 629 (1913), in part.—Pilger in Bot. Jahrb. LIV. 38 (1916).—Not D. Don.

Podocarpus macrophylla var. *acuminatissima* Pritzel in Bot. Jahrb. XXIX. 213 (1900).

YUNNAN: Szemao, Yulo forest, alt. 1300 m., *A. Henry*, no. 12919.

DISTRIBUTION: India and Burmah eastward through Malaya.

Henry's specimen, which is the only one we have seen from Yunnan, consists of a leafy shoot only. It may not belong to this species, although it agrees well with a specimen so-named collected in Perak by L. Wray, Jr. (No. 2922), and received from Herb. Singapore. Hayata records it as collected by Professor Kawai on the Tonkin border. My own knowledge of this tree in China is based on specimens cultivated in the grounds of several temples on and around Mt. Omei in western Szechuan.

Podocarpus Forrestii Craib & W. W. Smith in Notes Bot. Gard. Edinburgh, XII. 219 (1920).—Dallimore & Jackson, Handb. Conif. 46 (1923.)

Podocarpus macrophyllus Diels in Notes Bot. Gard. Edinburgh, VII. 258 (Pl. Chin. Forrest) (1912).—Not D. Don.

DISTRIBUTION: Yunnan, the Tali Range.

I have seen no material of this species.

Podocarpus Mairei Lemée & Léveillé in Le Monde des Pl. 1914, 20.

DISTRIBUTION: Yunnan.

This is an obscure plant which is unknown to me except by the author's brief description and which may not belong to the genus. Possibly it is referrable to *Keteleeria Davidiana* Beissn.

PINACEAE

Subfam. ABIETEAE Spach

Pinus L.

Pinus tabulaeformis Carrière, Traité Conif. ed. 2, 510 (1867).

YUNNAN: Yunnanfu district, *C. Schneider*, nos. 116, 119, 141 February, 1914.

DISTRIBUTION: China, wide-spread, being found at sea-level in the colder parts and on mountains above 1000 m. throughout the warmer provinces; also in southern Mongolia and in Manchuria as far east as the watershed of the Yalu River.

The above are the only specimens of the common mountain Hard Pine of China which I have seen from Yunnan province; however, in all probability it is quite common on the mountains of the more northern parts.

My colleague, A. Rehder, discusses the name of this Pine and its priority on page 22 of this number of the Journal of the Arnold Arboretum.

Pinus yunnanensis Franchet in Jour. de Bot. XIII. 253 (1899).—Masters in Jour. Linn. Soc. XXVI. 553 (1902); XXXVII. 415 (1906).—Shaw in Sargent, Pl. Wilson. I. 2 (1911).—Patschke in Bot. Jahrb. XLVIII. 657 (1912).

Pinus sinensis var. *yunnanensis* Shaw in Sargent, Pl. Wilson. II. 17 (1914); Genus Pinus, 60, t. 23, fig. 202–203 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923).—Dallimore & Jackson, Handb. Conif. 451 (1923).

YUNNAN: between Kambalti and Tengyueh, via Kuyung, *J. F. Rock*, no. 7545, November, 1922; between Tengyueh and Lungling, *J. F. Rock*, no. 7098, Oct.-November, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8037, March, 1923; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 11699, (1923–24); north of Yunnanfu, *C. Schneider*, no. 276, March, 1914.

SZECHUAN: between Tungan-chou and Chang-kuan-chung, *C. Schneider*, no. 530. March, 1914; between Hui-li-chuo and Pai-kuo-wan, *C. Schneider*, no. 689, March, 1914; between Techang and Hang-lien-po, *C. Schneider*, no. 806, April, 1914.

DISTRIBUTION: western Yunnan northward to Washan in western Szechuan.

Shaw regards this Pine as a variety of the widely distributed *P. sinensis* Lambert, now known as *Pinus tabulaeformis* Carr., but with its red peeling bark, its very long (20–30 cm.) slender leaves most usually in fascicles of three, and its cocoa-brown cone with but slightly developed apophysis, it is really very distinct. I never had any difficulty in distinguishing it in the field. It is a low-level Pine in the river valleys of southwest Szechuan and west of the limits of the Red Basin. It extends southward into western Yunnan. It is a tree of medium size usually with long, drooping, slender leaves in fascicles of three on all the main shoots and relatively large, long-persistent cones. On the upper part of the trunk and main branches the bark is usually red and exfoliates in thin sheets. On the lower part of the trunk the bark is persistent and deeply fissured into irregular, oblong masses. The branches are rather short and the habit usually pyramidal, though old trees are frequently flat-headed. The wood is moderately close-grained and is used for fuel and also for general construction purposes.

Pinus insularis Endlicher, Syn. Conif. 157 (1847).—Clinton-Baker, Ill. Conif. III. 37, t. (1913).—Shaw, Genus Pinus, 60, t. 23, figs. 208–210 (1914).

Pinus Kesiya Royle apud Loudon, Gard. Mag. n. s. VI. 8 (1840), nomen seminudum.

Pinus taeda Blanco, Fl. Filip. 767 (1837).—Not Linnaeus.

Pinus khasiana Griffith, Notul. Pl. Asiat. IV. 18 (1854); Icon. Pl. Asiat. t. 367–368 (1854).

Pinus Kasya Royle apud Parlatore in De Candolle, Prodr. XVI. pt. 2, 390 (1868).—Brandis, Forest Fl. Brit. Ind. 508 (1874).—Kurz, For. Fl. Brit. Burmah II. 499 (1877).—Gamble, Man. Ind. Timbers, 397 (1881).—Hooker f., Fl. Brit. Ind. VI. 652 (1888).

Pinus Khasya Brandis, Ind. Trees, 690 (1906).—Clinton-Baker Ill. Conif. III. 38, t. (1913).—Dallimore & Jackson, Handb. Conif. 400 (1923).

YUNNAN: between Kingtung Chai and Muang Hing, alt. 1500 m., *J. F. Rock*, no. 2694, March, 1922; watershed of the Black River between Man Lien and Hsinfu, *J. F. Rock*, no. 2941, March, 1922; between Chehu and Noan-Ma-Kai, *J. F. Rock*, no. 2965, March, 1922; valley of the Salween River, alt. 2200-2000 m., *H. Handel-Mazzetti*, no. 8401, Sept., 1915.

UPPER BURMAH, KENG TUNG TERRITORY: between Pang-Sop-Lao and Ban-Yang-Kha, alt. 1000 m., *J. F. Rock*, no. 2147, January, 1922; Ban Saa, alt. 1000 m., *J. F. Rock*, no. 2261, Jan.-Feb., 1922; on ridges above Ta Ping, between Meh Lui river and Muang Mah, alt. 800–1200 m., *J. F. Rock*, no. 2297, Feb., 1922.

DISTRIBUTION: Philippines, Upper Burmah, Assam and southwestern Yunnan.

Rock remarks that this Pine is the most common tree in extreme southwestern Yunnan and that around Szemao the hillsides are covered with it to the exclusion of nearly every other tree. Dr. Handel-Mazzetti's specimen is from about the northern limits of the range of the species.

Pinus Merkusii Junghuhn & De Vriese in De Vriese, Pl. Nov. Ind. Bat. Or. 5, t. 2 (1845).—Endlicher, Syn. Conif. 176 (1847).—Miquel, Fl. Nederl. Ind. II. 1069 (Fl. Ind. Bat.) (1856).—De Boer, Conif. Archip. Ind. 5 (1866).—Parlatore in De Candolle, Prodr. XVI. pt. II. 389 (1868).—Kurz, For. Fl. Brit. Burmah, II. 499 (1877).—Gamble, Man. Ind. Timbers, 398 (1881).—Hook. f., Fl. Brit. Ind. V. 652 (1888).—Brandis, Ind. Trees, 691 (1906).—Clinton-Baker, Ill. Conif. III, 41, t. (1913).—Shaw, Genus Pinus, 58, t. 23, figs. 198–200 (1914).—Dallimore & Jackson, Handb. Conif. 415 (1923).

Pinus sylvestris Loureiro, Fl. Cochinch. II. 579 (1790).—Not Linnaeus.

Pinus sumatrana Junghuhn in Bot. Zeit. 1846, 699.

Pinus Finlaysoniana Wallich apud Blume, Rumphia, III. 210 (1847).

Pinus Latteri Mason in Jour. Asiat. Soc. I. 74 (1849).—Kurz in Flora, 1872, 264.

UPPER BURMAH, KENG TUNG TERRITORY: between Pang Sop Lao and Ban Yang Kha, valley of the Meh Len, alt. 800–1100 m., *J. F. Rock*, no. 2155, Jan., 1922.

SIAM, CHIENGMAI PROV.: between Meh Soi and Hue San, alt. 480–525 m., *J. F. Rock*, no. 1836, January, 1922.

This species has not yet been reported wild in China proper, but since it grows in the Upper Shan States adjacent to southwestern Yunnan it will probably be found in that province. In this herbarium there is a specimen of this Pine collected in Hainan by F. A. McClure (No. 9805) from a planted tree.

Pinus Massoniana Lambert, Descr. Pinus, I. 17, t. 12 (1803); ed. 2, I. 16, t. 8 (1828); ed. minor, 20, t. 8 (1832).—Shaw in Sargent, Pl. Wilson. I. 1, (1922); II. 14 (1914), where full references and an account of this species will be found.

DISTRIBUTION: China, widely spread throughout the warmer parts from sea-level up to 1800 m.; also in Formosa but doubtfully indigenous there.

There is no material from Yunnan of this species in this herbarium neither have I actual knowledge of its growing there, but there is little doubt that it does.

Pinus Armandi Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 95, t. 12 (Pl. David. I. 285) (1884); in Jour. de Bot. XIII. 254 (1899).—Beissner in Nuov. Giorn. Bot. Ital. n. ser. IV. 184 (1897).—Masters in Jour. Linn. Soc. XXVI. 549 (1902); XXXVII. 415 (1906).—Clinton-Baker, Ill. Conif. I. 6, t. (1909).—Elwes & Henry, Trees Gr. Brit. & Irel. V. 1043 (1909).—Stapf in Bot. Mag. CXXXVI. t. 8347 (1910).—Mottet in Rev. Hort. 1910, 423, fig. 177–179.—Shaw in Sargent, Pl. Wilson. I. 1 (1911); II. 12 (1914); Gen. Pinus, 30, t. 9, fig. 96–99 (1914).—Bean, Trees, Shrubs Brit. Isles, II. 172, fig. (1914).—Wilson, Conif. Tax. Jap. 20 (1916).—Chun, Chin. Econ. Trees, 11, t. 5 (1922).—Rehder in Bailey, Cult. Evergreens, 305 (1923); in Jour. Arnold Arb. IV. 119 (1923).—Dallimore & Jackson, Handb. Conif. 370 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz, ed. 2, 72, fig. 74, t. 2, fig. o (1923).

Pinus quinquefolia David, Jour. Trois. Voy. Chin. I. 192 (1875), name only.
Pinus koraiensis Beissner in Nuov. Giorn. Bot. Ital. n. ser. IV. 184 (1897).—Masters in Jour. Linn. Soc. XXVI. 550 (1902); XXXVII. 415 (1906); in Gard. Chron. ser. 3, XXXIII. 34, fig. 18, 19 (1903).—Not Siebold & Zuccarini.
Pinus scipioniformis Masters in Bull. Herb. Boiss. VI. 270 (1898).
Pinus mandshurica Masters in Jour. Linn. Soc. XXVI. 551 (1902).—Not Ruprecht, nor Murray.
Pinus Mastersiana Hayata in Gard. Chron. ser. 3, XLIII. 194 (1908).
Pinus Armandi var. *Mastersiana* Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 215, fig. 8 (Fl. Mont. Formos.) (1908).
Pinus levis Lemée & Léveillé in Fedde, Rep. Spec. Nov. VIII. 60 (1910).
Pinus excelsa var. *chinensis* Patschke in Bot. Jahrb. XLVIII. 657 (1912).

YUNNAN: Watershed of the Black River or Papienho, between Mohei and Maokai and beyond Chugai, alt. 2100–2300 m., *J. F. Rock*, nos. 2994, 3019, April, 1922; headwaters of the Red River between Mao-goi and Nan-chien, alt. 2000 m., *J. F. Rock*, no. 3025, April, 1922; drainage basin of Erhhai (Lake of Talifu), Tsangshan Range. alt. 2300–2600 m., *J. F. Rock*, no. 3170, April, 1922; Yangtsze watershed, Likiang plateau, *J. F. Rock*, nos. 3614, 5877, May, 1922; west of Talifu, Mekong watershed, between Youngchang and Tengyueh *J. F. Rock*, no. 6792, Sept.-Oct., 1922; Yunnanfu, *C. Schneider*, nos. 117, 142, February, 1914; Mengtsze, alt. 2300 m., *A. Henry*, no. 10519; district of Mi-le, *A. Henry*, no. 9868; without locality, *E. E. Maire;* without locality, *G. Forrest*, no. 11919.

DISTRIBUTION: China, mountains south of the Yellow River in central,

western and southwestern China; also in Formosa and on the Japanese Islands of Tanega-shima and Yaku-shima.

This is the only 5-needle Pine native of China. In Yunnan it is fairly common. Rock says that around Tali Lake it grows in association with *Pinus yunnanensis* Franch. In 1899 I gathered ripe seeds at 2300 m. altitude near Lu-tung-po where the tree was growing associated with *Magnolia Delavayi* Franch.

Larix Mill.

Larix Potaninii Batalin in Act. Hort. Petrop. XIII. 385 (1893).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906); in Gard. Chron. ser. 3, XXXIX. 178, fig. 68 (1906).—Bean in Kew Bull. Misc. Inform. XXIII. 173, t. (1910).—Patschke in Bot. Jahrb. XLVIII. 651 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 18 (1914).—Chun, Chin. Econ. Trees, 6, fig. 3 (1922).—Rehder in Jour. Arnold Arb. IV. 121 (1923); in Bailey, Cult. Evergreens, 290 (1923).—Dallimore & Jackson, Handb. Conif. 297 (1923).

Larix chinensis Beissner in Mitt. Deutsch. Dendr. Ges. V. 68 (1896); in Nuov. Giorn. Bot. Ital. n. ser. IV. 183, t. 5, fig. 1 (1897).—Pritzel in Bot. Jahrb. XXIX. 216 (1900).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906).—Patschke in Bot. Jahrb. XLVIII. 651 (1913).

Larix thibetica Franchet in Jour. de Bot. XIII. 262 (1899).—Pritzel in Bot. Jahrb. XXIX. 216 (1900).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906).

Larix Griffithii Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906).—Not Hooker f. & Thomson.

Pinus sinensis Voss in Putlitz & Meyer, Landlexicon, IV. 769 (1913).—Non Lambert.

YUNNAN: Yangtsze watershed, prefectural district of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, nos. 3404, 3839, May & October, 1922; same locality, nos. 8193, 11661, in 1923 24; without locality *G. Forrest*, no. 10185.

DISTRIBUTION: mountains of northwestern Yunnan and northward on those of western Szechuan and southern Kansu and eastward to the mountains of Shensi.

The cones of Rock's no. 3404 are from 6 to 7.5 cm. long and are much larger than I have heretofore seen. At first glance the specimen suggests *L. Griffithiana* Hook. f. & Thoms. but it has the polished glabrous shoot, leaves keeled on both surfaces and erect bracts to the cone-scales characteristic of *L. Potaninii* Batal.

Picea A. Dietr.

Sect. CASICTA Mayr.

Picea likiangensis Pritzel in Bot. Jahrb. XXIX. 217 (1900).—Masters in Jour. Linn. Soc. XXVI. 554 (1902); XXXVII. 418 (1906).—Beissner, Handb. Nadelholzk. ed. 2, 249 (1909).—Patschke in Bot. Jahrb. XLVIII. 632, fig. 1, 6 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 31 (1914).—Chun,

Chin. Econ. Trees, 19 (1922).—Rehder in Bailey, Cult. Evergreens, 285 (1923).—Dallimore & Jackson, Handb. Conif. 334, fig. 73 (1923), excluding synonyms.

Abies likiangensis Franchet in Jour. de Bot. XIII. 257 (1899).

Picea Alcockiana Masters in Jour. Linn. Soc. XXXVII. 418 (1906).—Not Carrière.

YUNNAN: High plateau between Talifu and Likiang to the foot of the Likiang Snow Range, *J. F. Rock*, no. 3271, May, 1922; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 3542, May-October, 1922; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 10888, in 1923–24; Likiang Snow Range, alt. 2500 m., *J. M. Delavay*, no. 1031, July, 1884; Yungning, *C. Schneider*, no. 1612, June, 1914; without locality, *G. Forrest*, nos. 10151, 10295.

SZECHUAN: Between Kalapa and Liuku, alt. 3900 m., *C. Schneider*, no. 1291, May, 1914; Molien, alt. 3000–3600 m., *C. Schneider*, no. 1428, May, 1914; between Oti and Ouentin, alt. 2800 m., *C. Schneider*, no. 1452, June, 1914; between Choso and Woloho, alt. 3000 m., *C. Schneider*, no. 1573, June, 1914.

DISTRIBUTION: Mountains of northwestern Yunnan northward to the neighborhood of Tachien-lu in western Szechuan.

Schneider's specimens are mostly without cones and some may belong to the related *P. montigena* Mast. The Likiang Spruce is evidently a very common tree in the alpine regions of northwestern Yunnan, as it is round Tachien-lu and elsewhere in southwestern Szechuan. It is cultivated in England from seeds that I sent from Tachien-lu in 1904 to Messrs. Veitch (Seed nos. 1836, 1834). There is growing in this Arboretum plants of a Spruce received in 1924 from Messrs. Hillier & Sons of Winchester, England, under the name of "*P. yunnanensis*" which are evidently *P. likiangensis* Pritzel.

Messrs. Dallimore & Jackson (l.c.) would include under this species the *P. likiangensis* var. *rubescens* Rehd. & Wils., *P. Balfouriana* Rehd. & Wils. and would relegate *P. purpurea* Mast. to varietal rank. In the present state of our knowledge such wholesale lumping is likely to make confusion worse confounding.

Picea montigena Masters in Gard. Chron. ser. 3, XXXIX. 146, fig. 56 (1906), excluding cone.—Patschke in Bot. Jahrb. XLVIII. 632 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 33 (1914).—Chun, Chin. Econ. Trees, 18 (1922).—Rehder in Bailey, Cult. Evergreens, 284 (1923).

YUNNAN: Yangtsze watershed, Prefectural district of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, nos. 3403, 4761, 5328, May–October, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan and Likiang, *J. F. Rock*, no. 8158, March, 1923; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 10890, in 1923–24.

SZECHUAN: between Yenyuan Hsien and Hunka, alt. 2900 m., *C. Schneider*, no. 1486, June, 1914.

DISTRIBUTION: Mountains of northwestern Yunnan northward to those round Tachien-lu in western Szechuan.

Messrs. Dallimore & Jackson (Handb. Conif., 316 [1923]) reduce this species to *P. asperata* Mast., but the latter is an EUPICEA while *P. montigena* Mast. belongs to the section CASICTA.

Sect. OMORICA Mayr.

Picea complanata Masters in Gard. Chron. ser. 3, XXXIX. 146, fig. 57 (1906).—Beissner, Handb. Nadelholzk. ed. 2, 288 (1909).—Bean in Kew Bull. Misc. Inform. 1910, 174.—Patschke in Bot. Jahrb. XLVIII. 632 (1913). —Rehder & Wilson in Sargent, Pl. Wilson. II. 35 (1914).—Rehder in Bailey, Cult. Evergreens, 286 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. ed. 2, 33, fig. (1923).

Abies brachytyla Franchet in Jour. de Bot. XIII. 258 (1899), as to Delavay's specimen, not *Picea brachytyla* Pritzel.

YUNNAN: Between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8142, March, 1923; Karila and Ponzela, Yangtsze watershed, southeast of Peimashan, *J. F. Rock*, no. 11705, in 1923; watershed of Salween and Irrawadi rivers, Tjiontson-lumba valley, alt. 2950-3050 m., *H. Handel-Mazzetti*, no. 9209, July, 1916; "Ona-pen-Késu sur le Ma-eul-chan, 2500 m.," *J. M. Delavay*, no. 4129, August, 1889.

DISTRIBUTION: Mountains of western Yunnan, northward to those of Wen-ch'uan Hsien in western Szechuan.

An old detached cone, evidently picked from the ground, is associated in this herbarium with Rock's no. 11705. I do not think it belongs there or to the species, but to *Picea likiangensis* Pritzel. Dr. Stapf in Bot. Mag. CXLVIII. sub t. 8969 (1922) unites all the Chinese Spruces of the OMORICA group under *Picea brachytyla* Pritzel; Dallimore & Jackson do the same. I am unable to agree to this drastic lumping together. As I know them in a wild condition these trees present many differences which are, I think, entitled to recognition. As our knowledge increases and the plants become properly known under cultivation it will be possible to critically revise the classification of the species of Picea native of China, but that time is not yet. Whatever disposition is made of the three Omorica Spruces (*P. complanata* Mast., *P. ascendens* Patsche, *P. Sargentiana* Rehd. & Wils.) of Yunnan and western Szechuan I am convinced that that of western Hupeh and eastern Szechuan (*P. brachytyla* Pritzel) will be recognized as a good and perfectly distinct species.

Picea ascendens Patschke in Bot. Jahrb. XLVIII. 632 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 34 (1914).—Rehder in Bailey, Cult. Evergreens, 286 (1923).

YUNNAN: western slope of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, nos. 4136, 10865, 10889, May-June, 1922 and April, 1923; Litiping Range, Mekong-Yangtsze divide, east of Weihsi, *J. F. Rock*, no. 11574, in 1923; Salween valley, border of Tsarong, Tibet, *J. F. Rock*, no. 11498, in 1923.

DISTRIBUTION: Mountains of northwestern Yunnan and northward to the district of Lungan-fu in northwestern Szechuan.

No. 11498 consists of a sterile branch and may belong to another species.

Tsuga Carr.

Tsuga yunnanensis Masters in Jour. Linn. Soc. XXVI. 556 (1902).—Beissner, Handb. Nadelholzk. ed. 2, 83 (1909).—Patschke in Bot. Jahrb. XLVIII. 639 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 63 (1914).—Hayata in Tokyo Bot. Mag. XXXI. 118 (1917).—Chun, Chin. Econ. Trees, 22 (1922).—Rehder in Bailey, Cult. Evergreens, 266 (1923).—Dallimore & Jackson, Handb. Conif. 538, fig. 119 (1923).—Downie in Notes Bot. Gard. Edinburgh, XIV. 16, fig. 194, 1 (1923).

Abies dumosa var. *chinensis* Franchet in Jour. de Bot. XIII. 258 (1899), as to Delavay's specimen.

Abies yunnanensis Franchet in Jour. de Bot. XIII. 258 (1899).—Bois in Jour. Soc. Hort. France, ser. 4, I. 231 (1900).

Tsuga dura Downie in Notes Bot. Gard. Edinburgh, XIV. 16, fig. 194, 2 (1923).

Tsuga leptophylla Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 25, p. 3 (Anzeig. Akad. Wiss. Wien. no. 10.) (1924).

YUNNAN: Shweli River drainage basin to summit of Shweli-Salween watershed east of Tengyueh, *J. F. Rock*, no. 7643, November, 1922; Mount Lauchunshan, southwest or the Yangtsze bend of Shiku, *J. F. Rock*, no. 11493, in 1923; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8152, March, 1923; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, nos. 3540, 3724, May-October, 1922; same locality, *J. F. Rock*, no. 9049, in 1923–24; Yangtsze watershed, western slopes of Likiang Snow Range, *J. F. Rock*, no. 4608, May 30–June 6, 1922; eastern slopes of the Likiang Snow Range, alt. 3200 m., *C. Schneider*, no. 1979, July, 1914; between Chung-tien and Chitsung, alt. 3200–3575 m., *H. Handel-Mazzetti*, no. 7795, August, 1915 (co-type of *Tsuga leptophylla* Hand.-Mazz.); without locality, *G. Forrest*, no. 9056.

SZECHUAN: Ning-yuan-fu, Lo-tieh shan, alt. 2900–3500 m., *C. Schneider* nos. 914, 4001, April 15, 1914; Lololand, *C. Schneider*, no. 3974, April, 1914.

DISTRIBUTION: high mountains of western Yunnan northward to those of Wen-ch'uan Hsien in western Szechuan.

This species of Hemlock Fir is quite local in distribution as compared with *T. chinensis* Pritzel, being known only from the mountains of the extreme west. There, however, it is plentiful and grows to a large size. The species is well distinguished by its leaves which are entire and rounded

at the apex with a margin usually serrulate and by its sessile cone with dull flexible cone-scales which are inclined to curve outward at the summit.

Tsuga chinensis Pritzel in Bot. Jahrb. XXIX. 217 (1900).—Masters in Jour. Linn. Soc. XXVI. 556 (1902); XXXVII. 421 (1906).—Beissner, Handb. Nadelholzk. ed. 2, 82 (1909).—Patschke in Bot. Jahrb. XLVIII. 639 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 37 (1914).—Bean, Trees, Shrubs Brit. Isles, II. 606 (1914).—Downie in Notes Bot. Gard. Edinburgh, XIV. 18, fig. 194, 5 (1923).—Chun, Chin. Econ. Trees, 22, fig. 7 (1922).—Rehder in Bailey, Cult. Evergreens, 266 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelholz. ed. 2, 36, fig. (1923).—Dallimore & Jackson, Handb. Conif. 533, fig. 117 (1923).

Abies thei-sha David, Jour. Trois. Voy. Chin. I. 343 (1875), name only.

Abies Tsuga Franchet in Nouv. Arch. Mus. Paris, ser. 2, VII. 97 (Pl. David. I. 287) (1884).—Not Siebold & Zuccarini.

Abies dumosa var. *chinensis* Franchet in Jour. de Bot. XIII. 258 (1899), excl. Delavay's specimen.

Abies chinensis Franchet in Jour. de Bot. XIII. 259 (1899).—Bois in Jour. Soc. Hort. France, ser. 4, I. 230 (1900).

Tsuga dumosa var. *chinensis* Pritzel in Bot. Jahrb. XXIX. 217 (1900).

Tsuga Sieboldi Pritzel in Bot. Jahrb. XXIX. 217 (1900).—Masters in Jour. Linn. Soc. XXVI. 556 (1902); XXXVII. 421 (1906); in Jour. Bot. XLI. 270 (1903).—Not Carrière.

Tsuga yunnanensis Masters in Gard. Chron. ser. 3, XXXIX. 236, fig. 93 (1906), in part; XXXVII. 421 (1906).—Bean in Kew Bull. Misc. Inform. 1910, 176.—Not Masters in Jour. Linn. Soc. XXVI. 556 (1902)

Tsuga Brunoniana Masters in Jour. Linn. Soc. XXXVII. 421 (1906).—Downie in Notes Bot. Gard. Edinburgh XIV. 19 (1923).—Not Carrière.

Tsuga diversifolia Masters in Jour. Linn. Soc. XXXVII. 422 (1906), as to Formosan plant.—Not Masters in Jour. Linn. Soc. XVIII. 514 (1881).

Tsuga formosana Hayata in Gard. Chron. ser. 3, XLIII. 194 (1908); Jour. Coll. Sci. Tokyo, XXV. art. 19, 222, fig. 12 (Fl. Mont. Formos.) (1908); in Fedde, Rep. Spec. Nov. VIII. 366 (1910); Act. III. Congr. Internat. Bot. Bruxelles, 1910, II. 76, pl. 28 (1912); Icon. Pl. Formos. V. 206 (1915).—Kanehira, Formos. Trees, 617 (1917).

Tsuga patens Downie in Notes Bot. Gard. Edinburgh, XIV. 16, fig. 194, 6 (1923).

Tsuga Wardii Downie, l. c. 17, fig. 194, 4.

Tsuga calcarea Downie, l. c. 17, fig. 194, 3.

Tsuga Forrestii Downie, l. c. 18, fig. 194, 7.

Tsuga intermedia Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 25, p. 2 (Anzeig. Akad. Wiss. Wien. no. 10) (1924).

YUNNAN: eastern slopes of Mount Dyinaloko, northern peak of the Likiang Snow Range, *J. F. Rock*, no. 8986, in 1923; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 10891, in 1923-24; Tongtchouan, Tche-hai, alt. 2900-2990 m., *E. E. Maire*, June and August, 1916; without locality, *G. Forrest*, no. 10293.

SZECHUAN: Muli or Mili Kingdom, *J. F. Rock*, no. 11707, June, 1922.

CHEKIANG: hillsides, alt. 1330 m., *R. C. Ching*, no. 2400, August, 1924.

DISTRIBUTION: mountains of Formosa, Chekiang, Hupeh and westward through Szechuan and Yunnan.

This is the common Hemlock Fir of China being especially abundant on

the high mountains of Formosa and extreme western Szechuan. It is easily recognized by its emarginate leaves, the longest of which are often obscurely serrulate, and by its polished stipitate cones with stiff woody cone-scales bevelled and inclined to be incurved at the summit.

After a careful study of the mass of material in this herbarium, my field notes and knowledge of this Hemlock in the wild I cannot agree with Miss Downie in her recent attempt to establish a number of species of what she calls the CHINENSIS group. That such a wide spread species should exhibit a certain variation is to be expected but as I view it these variations are both trivial and unimportant. The lengthy and involved synonymy of this plant shows how greatly it has been misunderstood.

Pseudotsuga Carr.

Pseudotsuga Wilsoniana Hayata, Icon. Pl. Formos. v, 204, t. 15 (1915).—**Kanehira, Formos. Trees, 614 (1917).**

Pseudotsuga japonica Matsumura & Hayata in Jour. Coll. Sci. Tokyo. XXII. 400 (Enum. Pl. Formos.) (1906).—Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 223 (Fl. Mont. Formos.) (1908).—Not Shirasawa.

Pseudotsuga Forrestii Craib in Notes Bot. Gard. Edinburgh, XI. 189, fig. 160 (1919).

YUNNAN: mountains of Lonjre, Mekong-Salween watershed, adjoining southeastern Tibet, *J. F. Rock*, nos. 10260, 11625; sub jugo Doker-la, 28° 25′, alt. 3000–3100 m., *H. Handel-Mazzetti*, no. 8058, September 19, 1915.

DISTRIBUTION: mountains of western Yunnan and of Formosa.

As pointed out in Jour. Arnold Arb. II. 25–41 (1920) the relationship of the mountain flora of the island of Formosa is with western China. This Pseudotsuga forges another link in the chain of which the Taiwania and *Libocedrus macrolepis* Benth. & Hook. f. furnish other notable examples. So far as our meagre knowledge goes this Pseudotsuga is confined to the mountains of Formosa and those of extreme western Yunnan, whereas, the other Chinese species, *P. sinensis* Dode, is distributed sparingly from the coastal provinces to northeastern Yunnan. In herbaria it is not at all easy to distinguish any of the species of Pseudotsuga, the distinctions being both subtle and obscure. Craib in establishing his *P. Forrestii* points out that transverse section of the leaves show that the hypoderm is developed only immediately above and below the midrib and the epidermal cells are oblong. I find this character constant in many sections taken from Formosan and Yunnan specimens. It may be added that the resin-ducts are marginal and sub-epidermal. The endodermis is well-marked consisting of rounded thin-walled, bead-like cells; the margin is blunt in section, rayed idioblasts may or may not be present in the parenchyma; the epidermal cells are much thickened and uniform in character, the lower surface of the leaf is markedly papillose. Craib states that he had not seen *P. Wilsoniana* Hayata; if he had, the identity of his plant and Hayata's would have been apparent to him.

Morphologically *P. Wilsoniana* may be distinguished by its shining chestnut-brown or red-brown, sparsely pubescent, puberulous or glabrescent shoots, by its ciliate bud-scales, by its relatively thick leaves varying from 1.5 to 4.5 cm. in length, with midrib glaucous on the lower surface and the stomatic lines extending virtually to the margin of the leaf. Rarely is any green to be detected on the under surface of the leaf. The cone is erect, peduncled, ellipsoid to ovoid from 4–6 cm. long with a very prominent cuspis to the exserted deflexed bract. The seeds with the wing measure from 1.6–2 cm. in length, the base of the wing is cuneate with the apex rounded or abruptly obtuse.

We are without information as to the general appearance of this tree as it grows in Yunnan. During my travels in Formosa in 1917 and 1918 I saw only one tree of this Pseudotsuga. This was about 80 feet tall with a short trunk 12 feet in girth and three ascending stems so the real habit of the tree was obscured. The branches were relatively thin, horizontally spreading and slightly upturned toward the ends. The crown had no particular shape though it was more or less ovoid and flattened in outline. It was growing among various broad-leaf trees mostly belonging to the families Fagaceae and Lauraceae at an altitude of 4900 ft. in north-central Formosa. I was told of it being fairly common in several districts on that island where, owing to the unfriendly attitude of the savages, it was not possible for me to venture. Nevertheless, from what I could learn it was nowhere plentiful. Its altitudinal range is said to be from 4500 to 7000 ft. The sap and heart woods are clearly differentiated—the former is creamy white to pale yellow tinged with pink, the heart-wood is yellow-brown tinged pink. The annual rings are narrow but distinct; the specific gravity of the wood ranges from 0.57 to 0.72.

Pseudotsuga sinensis Dode in Bull. Soc. Dendr. France, 1912, 58, fig.: in Mitt. Deutsch. Dendr. Ges. XXI. 387 (1912).—Craib in Notes Bot. Gard. Edinburgh, XI. fig. 161 (1919).—Chun, Chin. Econ. Trees, 23 (1922).—Rehder in Bailey, Cult. Evergreens, 265 (1923).

YUNNAN: Tong-tchouan, alt. 2990 m., *E. E. Maire*, June, 1916; Tchou-scen-tsen, alt. 2990 m., *E. E. Maire*, March.

CHEKIANG: northeast of Tai-tuan, alt. 650 m., *R. C. Ching*, no. 2144, July, 1924.

ANHWEI: Wang shan, alt. 1200, *A. N. Steward*, no. 7195. August, 1924.

DISTRIBUTION: mountains of northeastern Yunnan; also of Chekiang and Anhwei provinces.

I have no personal knowledge of this Pseudotsuga which is an interesting illustration of the marked difference between the floras of eastern China and of Formosa and extreme western China. The type locality of *P. sinensis* Dode is the district of Tong-tchouan or Tung-ch'uan in northeastern Szechuan. In Chekiang it is said by R. C. Ching to be very common at an altitude of 2000 ft. where it is a tree up to 120 ft. in height with

gray, deeply fissured bark. In Anhwei province Steward notes that he saw only one tree; it was growing in an open place and was 20 m. tall.

In herbaria this Pseudotsuga may be distinguished from the related *P. Wilsoniana* Hayata by its more pubescent shoots, by its much thinner leaves which show a raised green mid-rib and a distinct marginal line of green bordering the stomatic line, and by its seed which is smaller with a proportionately larger wing more obliquely narrowed to the apex. In transverse section the leaf of *P. sinensis* shows a well-marked continuous or virtually continuous hypoderm and the thinness of the leaf as compared with that of *P. Wilsoniana* is most marked. The epidermal cells are nearly as broad as long; the margin is sub-acute in section with sclerotic strengthening tissue present. Rayed idioblasts may or may not be present and the resin-ducts are marginal and subepidermal.

It may be stated here that the Japanese *Pseudotsuga japonica* Shirasawa is at once distinguished from the two Chinese species by its glabrous pale gray shoots, and by other marked differences.

Keteleeria Carr.

Keteleeria Davidiana Beissner, Handb. Nadelholzk. 424, fig. 117 (1891).—Van Tieghem in Bull. Soc. France, xxxviii. 412 (1891).—Pritzel in Bot. Jahrb. xxix. 217 (1900).—Masters in Jour. Linn. Soc. xxvi. 554 (1902); xxxvii. 421 (1906); in Gard. Chron. ser. 3, xxxiii. 84, fig. 37, 38 (1903); in Jour. Bot. xli. 270 (1903).—Mottet in Rev. Hort. 1904, 130, fig. 53.—Clinton-Baker, Illust. Conif. i. 72 t. (1909).—Henry in Elwes & Henry, Trees Great Brit. & Irel. vi. 1475 (1912).—Patschke in Bot. Jahrb. xlviii. 649 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 39 (1914).—Kanehira, Formos. Trees, 602 (1917).—Chun, Chin. Econ. Trees, 24, fig. 8 (1922).—Rehder in Bailey, Cult. Evergreens, 247, fig. 64 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. ed. 2, 30, fig. (1923).—Dallimore & Jackson. Handb. Conif. 269, fig. 62 (1923).

Pseudotsuga Davidiana Bertrand apud Carrière in Rev. Hort. 1873, 37, fig. 3, 4, 5.—Bertrand in Ann. Sci. Nat. ser. 5, xx. 86 (1874).

Abies sacra David, Jour. Trois. Voy. Chin. ii. 29 (1875), name only.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, vii. 100, t. 14 (Pl. David. i. 290, t. 14) (1884).

Pinus (*Pseudotsuga*) *Davidiana* McNab in Proc. Roy. Irish Acad. ser. 2, ii. 702 (1877).

Abies Davidiana Franchet in Nouv. Arch. Mus. Paris, ser. 2, vii. 98, t. 13 (Pl. David. i. 288, t. 13) (1884); in Jour. de Bot. xiii. 260 (1899).—Masters in Gard. Chron. ser. 3, i. 481 (1887).

Keteleeria sacra Beissner, Handb. Nadelholzk. 426 (1891).—Van Tieghem in Bull. Soc. Bot. Francę, xxxviii. 412 (1891).—Mottet in Rev. Hort. 1904, 130.—Patschke in Bot. Jahrb. xlviii. 649 (1913).

Keteleeria Delavayi Van Tieghem in Bull. Soc. Bot. France, xxxviii. 412 (1891), nomen seminudum.

Podocarpus sutchuenensis Franchet in Jour. de Bot. xiii. 265 (1899).—Pritzel in Bot. Jahrb. xxix. 213 (1900).—Masters in Jour. Linn. Soc. xxvi. 548 (1902); xxxvii. 414 (1906).

Pinus sacra Voss in Mitt. Deutsch. Dendr. Ges. xvi. 94 (1907).

Keteleeria formosana Hayata in Gard. Chron. ser. 3, XLIII. 194 (1908).
Keteleeria Davidiana var. *formosana* Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 221 (Fl. Mont. Formos.) (1908).
Keteleeria Esquirolii Léveillé in Fedde, Rep. Spec. Nov. VIII. 60 (1910).

YUNNAN: Puerhfu, alt. 2150 m., *J. F. Rock*, no. 2888, March, 1922; watershed of the Black River or Papienho, between Mopo and Man-pieh, alt. 1450 m., *J. F. Rock*, nos. 2975, 2922, March-April, 1922; high plateau between Talifu and Likiang, *J. F. Rock*, nos. 3213, 6321, May and August, 1922; mountains south of Likiang, Sungkwe Hochin Range, *J. F. Rock*, nos. 8289, 10892, in 1923; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8172, March, 1923; region of Tungshan, Yangtsze drainage basin, east of Likiang, *J. F. Rock*, no. 11711, in 1923; between Likiangfu and Yunnanfu, via Youngpei, Hwaping, Magai and Wuting, *J. F. Rock*, no. 11729, March, 1924; Szemao, alt. 1600 m., *A. Henry*, nos. 12734, 12855; Tong-tchouan, Kin-tschong-chan and Tche-hai, alt. 2990 m., *E. E. Maire*, March, April, June, 1916; Yunnanfu, *C. Schneider*, nos. 61, 118, 4031, Feb.-March, 1914; without locality, *G. Forrest*, nos. 10230, 11425.

DISTRIBUTION: mountains of Formosa and in Hupeh, Kweichou, Szechuan and Yunnan.

This Yunnan material presents all the variations mentioned by Rehder & Wilson but there is no mistaking it as belonging to one species only. In many of the specimens the leaves are very glaucous on the lower surface and this character is particularly noticeable on young foliage. The cone-scales are often more or less erose, varying greatly in this character which is especially pronounced in Rock's no. 8289.

This tree is evidently very plentiful throughout Yunnan as it is also in Hupeh and Szechuan; in Formosa on the other hand I found it to be quite rare. *Tsuga Mairei* Lemée & Léveillé (in Monde des Pl. XVI. 20 [1914]) probably belongs here.

Keteleeria Evelyniana Masters in Gard. Chron. ser. 3, XXXIII. 194, fig. 82 (1903).—Beissner in Mitt. Deutsch. Dendr. Ges. XII. 66 (1903).
Pinus Evelyniana A. Voss in Putlitz & Meyer, Landlex. IV. 773 (1913).

YUNNAN: Yuanchiang, alt. 1300 m., *A. Henry*, no. 11815.

DISTRIBUTION: Yunnan, endemic.

In all probability this is nothing more than a condition of the widespread and exceedingly variable *K. Davidiana* Beissn.

Abies Juss.

Abies Beissneriana Rehder & Wilson in Sargent, Pl. Wilson. II. 46 (1914).—Chun, Chin. Econ. Trees, 30 (1922).—Rehder in Bailey, Cult. Evergreens, 254 (1923).—Dallimore & Jackson, Handb. Conif. 87 (1923).

YUNNAN: Yangtsze watershed, prefectural districts of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, nos. 3811, 8375, May and October, 1923–24; between Tengyueh and Likiangfu, via Shweshanting, Kantingai,

Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8141, March, 1923: Mount Kenyichunpo and region of Chemputong, Salween-Irrawadi watershed, *J. F. Rock*, no. 11518, in 1923; without locality *G. Forrest*, no. 10281; between Yungning and Yungpeh, *C. Schneider*, no. 1648, June 23, 1914.

DISTRIBUTION: mountains of northwest Yunnan northward to Muping in western Szechuan.

In Plantae Wilsonianae a full account of this species is given. The specimens cited above call for no special remark. Rock's no. 8375 has male flowers which show that the pollen sacks are yellow. His No. 11518 has leaves up to 7.5 cm. long and is evidently from a young plant. The gray polished character of the shoots and the lustrous green upper surface of the leaves is well-marked. Among the Chinese Abies this species is most closely related to *A. chensiensis* Van Tieghem, a native of northwestern Hupeh and southern Shensi.

As Rehder points out (in Jour. Arnold Arb. I. 54 (1919)) the name *Abies Beissneriana* Rehder & Wilson is not invalidated by the earlier *A. Beissneriana* Mottet which is a non-valid name having been given to a hybrid already provided with a specific name.

Abies Delavayi Franchet in Jour. de Bot. XIII. 255 (1899).—Masters in Jour. Linn. Soc. XXVI. 557 (1902); in Gard. Chron. ser. 3, XXXIX. 212, fig. 82 (1906); in Jour. Linn. Soc. XXXVII. 422 (1906).—Beissner, Handb. Nadelholzk. ed. 2, 194 (1909).—Diels in Notes Bot. Gard. Edinburgh, XXXI. 252 (Pl. Chin. Forrest.) (1912).—Patschke in Bot. Jahrb. XLVIII. 642, fig. 3, (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 41 (1914).—Craib in Notes Bot. Gard. Edinburgh, XI. 277, fig. 163 (1919).—Chun, Chin. Econ. Trees, 27, fig. 10 (1923), exclud. synon.—Rehder in Bailey, Cult. Evergreens, 254 (1923).—Dallimore & Jackson, Handb. Conif. 97 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelh. ed. 2, 28, fig. 28 (1923).

Keteleeria Fabri Masters in Jour. Linn. Soc. XXVI. 555 (1902); in Gard. Chron. ser. 3, XXXIII. 194 (1903); in Jour. Linn. Soc. XXXVII. 421 (1906).—Mottet in Rev. Hort. 1904, 130.—Beissner, Handb. Nadelholzk. ed. 2, 203 (1909).—Patschke in Bot. Jahrb. XLVIII. 649 (1913).

Abies Fargesii Masters in Gard. Chron. ser. 3, XXXIX. 213, fig. 83 (1906); in Jour. Linn. Soc. XXXVII. 422 (1906).—Not Franchet.

Pinus Fabri Voss in Putlitz & Meyer, Landlex. IV. 773 (1913).

Abies Faberi Craib in Notes Bot. Gard. Edinburgh, XI. 278, fig. 164 (1919).

YUNNAN: Drainage Basin of Erhhai (Lake of Talifu), Tsangshan Range, *J. F. Rock*, no. 3148, April 13–25, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8068, March, 1923; Shweli River drainage basin to summit of Shweli-Salween watershed east of Tengyueh, *J. F. Rock*, no. 7652, November, 1922; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, nos. 10886, 10887, in 1923–24; between Hunka and Woloho, alt. 3000–3500 m., *C. Schneider*, no. 1533, June 13, 1914; Yen-yuan

Hsien, alt. 3300–3900 m., *C. Schneider*, nos. 3574, 3563, May, 1914; without locality, *G. Forrest*, no. 11898.

DISTRIBUTION: western Yunnan northward to Wen-ch'uan Hsien in western Szechuan.

The acquisition of ample Yunnan material collected by Rock and Schneider, as well as those of Forrest's in this herbarium, has enabled me to investigate again the leaf anatomy of this species. Mr. Craib (in Notes Bot. Gard. Edinburgh, XI. 278 (1919) separates the Szechuan tree under the name of *A. Faberi* from the typical *A. Delavayi* Franch. found in Yunnan basing his distinctions mainly on the excessive curling back of the leaf margins noticeable on Forrest's material and on Delavay's type specimen as opposed to the slightly recurved almost plane leaves on Szechuan material notably my No. 2089. The differences in the degree of recurving of the leaf-margin pointed out by Mr. Craib are present and indeed obvious on many specimens but I find every intermediate condition, moreover, in my No. 2093 collected in Mupin the leaf-margins on one part of the specimen are folded back almost to the mid-rib, on another part of the same branch the leaf margin is only slightly recurved and here and there the leaves are almost plane. The resin-ducts vary slightly in size but not in position. Contrary to Mr. Craib's statement I find the leaf-margin of the strongly recurved condition more acute in cross-section than when the leaf is plane or with the margin only slightly recurved. The strong recurving of the leaf-margin serves doubtless as protection from loss of moisture by excessive transpiration, but in herbarium specimens this obvious character may be much exaggerated by careless drying, for instance, by allowing the branch to wilt or by not drying it under greater pressure.

This further study confirms the opinion set forth in Plantae Wilsonianae II. 41 (1914). I find no constant characters by which to separate the specimens collected in Szechuan from those collected in Yunnan by Delavay, Forrest, Rock and others.

Abies Forrestii C. C. Rogers in Gard. Chron. ser. 3, LXV. 150 (March 29, 1919).—W. C. Craib in Notes Bot. Gard. Edinburgh, XI. 279 t. 162 (November, 1919).—Rehder in Bailey, Cult. Evergreens, 254 (1923).—Dallimore & Jackson, Handb. Conif. 101 (1923).

YUNNAN: Yangtsze watershed, prefectural district of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, nos. 3792, 10673, May and October, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8157, March, 1923; between Chienchuan plain and the Mekong drainage basin to Lachiming, *J. F. Rock*, no. 8611, May, 1923; Lotueshan mountains of Lakako, west of the Yangtsze bend at Shiku, *J. F. Rock*, no. 9543, in 1923; without locality, *G. Forrest*, nos. 10152, 10206, 10225.

DISTRIBUTION: high mountains of northwest Yunnan; not recorded from elsewhere.

This is a well-marked species distinguished by its very resinous winter-buds, by the rufous brown short hispid pubescence on the shoots, by its cylindric violet-purple, medium-sized cone, non-resinous and with short-exserted bracts. It is perhaps most closely related to the Himalayan *A. spectabilis* Spach (*A. Webbiana* Lindl.) which has similar pubescence on the shoots, but is much larger in all its parts, the leaves on adult trees being much longer and the cone twice the size with the bracts not exserted.

On material before me of *Abies Forrestii* the leaves are distinctly petiolate and vary from 1.5 to 3 cm. in length, are emarginate with the margin slightly recurved. In the cross section the leaves show a much thickened continuous hypoderm often in two layers with lateral sub-epidermal resin-canals of medium size and a number of sclerotic cells at the margin which is blunt in cross section. The endodermis is definite and the epidermis on the lower surface is very thick-walled.

The undescribed cone is sessile, violet-purple, non-resinous, cylindric 8.5 cm. high, about 4 cm. broad and the scales are about 1 cm. high, 1.5 to 2 cm. broad, thin and incurving at the summit. The bracts are slightly exserted and have a narrow-lanceolate acuminate cuspis outthrust and more or less recurved. The seed is dark purplish and with the hatchet shape wing is about 1.5 cm. long. This description is drawn from Rock's no. 10673. In young and half grown cones the lanceolate cuspis is bristle-like and more conspicuous. The white stomatic lines on the undersurface of the leaves are very conspicuous. The pollen-sacs are deeply tinged with violet-purple.

This species is usually ascribed to Craib but the description by C. C. Rogers which appeared six months earlier is quite sufficient to identify this distinct and well-marked Fir.

Subfam. Taxodieae Parl.

Cunninghamia R. Br.

Cunninghamia lanceolata Hooker in Bot. Mag. LIV. 7. 2743 (1827).—Rehder & Wilson in Sargent, Pl. Wilson. II. 50 (1914), where full references to synonymy and literature will be found.

YUNNAN: Plain of Tche-hai, alt. 2900 m., *E. E. Maire*, April; Mengtsze, mountains to the southeast, alt. 1600 m., *A. Henry*, no. 9148A.

DISTRIBUTION: China, south of the Yellow River from the extreme east to the west but not ascending above 2500 m.

More generally known as *Cunninghamia sinensis* R. Br., this is the most useful of all Chinese softwood trees, being employed in all branches of carpentry. The above are the only specimens in this herbarium collected in the province of Yunnan but during my visit there in 1899 I noted it as a common tree.

A synonym not recorded by Rehder & Wilson is *Cunninghamia sinensis* var. *prolifera* Lemée & Léveillé in Monde des Pl. 1914, 20. Proliferous cones are frequently found on any Cunninghamia tree .

Taiwania Hayata

Taiwania cryptomerioides Hayata in Jour. Linn. Soc. XXXVII. 330 t. 16 (1906); in Tokyo Bot. Mag. XXI. 21, t. 1. fig. 23 (1907).—Beissner, Handb. Nadelholzk. ed. 2, 484 (1909).—Clinton-Baker, Ill. Conif. III. 75, t. (1913).—Kanehira, Formos. Trees, 615, fig. (1917).—Bean in Gard. Chron. ser. 3, LXVIII. 213, fig. 99 (1920).—Handel-Mazzetti in Zeitschr. Gart. Obstb. 1. Gartenb. I. 25-27 (1920).—Rehder in Bailey, Cult. Evergreens, 237, fig. 58 (1923).—Dallimore & Jackson, Handb. Conif. 496 (1923).—Sorger in Oesterr. Bot. Zeitschr. LXXIV. 81, figs. (1925).

Taiwanites Hayata in Gard. Chron. ser. 3, XXXIX. 165 (1906).

YUNNAN: Watershed of the Salween and Irrawadi Rivers, alt. 2250 to 2800 m., *H. Handel-Mazzetti*, nos. 8915, 9664, June and August, 1916.

DISTRIBUTION: mountains of Formosa and those of extreme northwestern Yunnan.

Dr. Handel-Mazzetti's finding of Taiwania in northwestern Yunnan is one of the most interesting discoveries in recent work on the Chinese flora. He gives the exact locality as near Ninalo west of Chammutung, which is west of Tsekou on the Salween River. There in side valleys between 2300 and 2800 m. altitude he found giant trees which in habit and bark reminded him of Sequoia. The occurrence of Taiwania, of *Libocedrus macrolepis* Benth. & Hook. and of *Pseudotsuga Wilsoniana* Hayata, in western China and on the mountains of Formosa and at no place in between these widely separated regions is a remarkable fact in plant distribution. Since so little is known about the Taiwania perhaps a few words about it as it grows in Formosa may be welcome.

On Arisan in central Formosa the Taiwania grows scattered through the forests of *Chamaecyparis formosensis* Matsum., *C. obtusa* var. *formosana* Hay., *Trochodendron aralioides* S. & Z., evergreen Oaks, Lauraceae, Symplocos and evergreen shrubs in a narrow belt between 7000 and 8000 ft. altitude. In my opinion it formed in ancient times forests with the Trochodendron but has been defeated in the struggle by the two Chamaecyparis and the present trees are mere survivals. On Matsu-yama, a mountain in the Arisan forest reservation, it is more common than on Arisan itself. On Hsokei-hen, a forest reservation belonging to the Imperial University, Tokyo, it grows in small groups among evergreen Oaks. So far as my own observations go it is everywhere in Formosa a rare tree. Small trees are very uncommon and seedlings extraordinarily rare. The young trees have pendent branches and in the shade of the forests the branches are sparse and the tree unattractive. In the open it is a singularly beautiful and attractive Conifer densely branched, has graceful handsome branchlets and attractive green leaves. Tall trees in the forests are strikingly distinct but singularly like old Cryptomeria trees, and both suggest gigantic Lycopods. In the dense forests the crown is small, domeshape, oval or flattened, the branches few and small and one wonders how so little leafage can support so gigantic a tree. When the top is broken lateral branches

assume an erect position. In more open forests the branches are massive and wide-spreading but the crown is thin. In height the Taiwania overtops all other trees on Arisan and probably attains upwards of 200 ft. The highest I measured was 190 ft. tall and 130 ft. to the first branch. The girth is up to 30 ft.; the trunk is straight and mast-like, buttressed at the base. The bark is grey and thin, smooth and longitudinally fissured. The wood when green is heavier than water, when air dried its specific gravity is 0.46. There is very little sap wood which is pale in color; the heart wood is a rich mahogany brown with a purplish sheen becoming duller with exposure and age. It is strong, easily worked, but is not very durable. The trees are usually solid.

The Taiwania is essentially a light demanding tree and in Formosa favors northerly and northeasterly exposures. It is polygamo-dioecious and fruit is only found on the tops of the oldest trees. Male flowers on some trees are extraordinarily abundant. It sheds its small inner branchlets after the manner of Cryptomeria, Cunninghamia and Sequoia and is a very close relative of the latter.

I was fortunate enough to secure in 1918 three young seedling plants in the forests of Arisan and from the forestry officials at Keitao obtained a small nursery grown plant. All four were safely brought to the Arnold Arboretum. The plant roots easily from cuttings.

During my visits to Formosa I collected a great many seeds of the Taiwania but none of them proved viable. In the late autumn of 1924, through the good services of my friend, R. Kanehira, the Arnold Arboretum received seeds which germinated quickly and we now have a nice stock of young plants. On these seedlings the normal number of cotyledons is two, but occasionally three are present.

Cryptomeria D. Don

Cryptomeria japonica D. Don in Trans. Linn. Soc. XVIII. 167, t. 13, fig. 1 (1841).—Rehder & Wilson in Sargent, Pl. Wilson. II. 52 (1914).—Wilson, Conif. & Taxads Jap. 66, tt. 48–49 (1916), where complete references to the literature and a full account of this tree will be found.

Cupressus japonica Linnaeus f., Suppl. 421 (1781).—Thunberg, Fl. Jap. 265 (1784).

Taxodium japonicum Brongniart in Ann. Sci. Nat. XXX. 183 (1833), excluding var. *heterophylla*.

Cryptomeria Fortunei Otto & Dietrich in Allg. Gartenz. 1853, 234.

Cryptomeria japonica var. *japonica* Henry in Elwes & Henry, Trees Gr. Brit. Irel. I. 129 (1906).

Cryptomeria Kawaii Hayata in Tokyo Bot. Mag. XXXI. 117, figs. (1917).

YUNNAN: Mengtsze, temple grounds, alt. 1950 m., *A. Henry*, nos. 9667, 9667A; without locality, *E. E. Maire*.

DISTRIBUTION: Japan; often cultivated in the warmer parts of China more especially in the grounds surrounding temples and monasteries.

Authentic specimens from trees truly wild in China are unknown and there is no reliable record of any one having seen an indigenous tree any-

where in the Chinese empire. In *Plantae Wilsonianae* I expressed the opinion that it would appear highly improbable that the Cryptomeria had been introduced to the remote sparsely populated regions northwest of the Chengtu plain from Japan or eastern China. In the year 1914 during my travels through Japan I made an exhaustive study of Cryptomeria and this study was continued during the years 1917 and 1918 when again visiting the Orient. It is now my matured opinion that Cryptomeria is purely a Japanese tree and that its occurrence in China is due to it having been brought there from Japan in the first instance by Buddhist priests or proselytes. When in Japan in 1917, Dr. B. Hayata showed me the type specimens of his *C. Kawaii*. To me they did not look different from material I could have gathered from trees in any good sized grove of Cryptomeria in Tokyo or elsewhere in Japan. The armature of the cone scale in Cryptomeria is notoriously variable, and the size of the cone also varies a good deal. Maire's specimen cited above agrees almost exactly with that collected by Professor S. Kawaii. Under cultivation in Japan many distinct varieties of this tree have appeared exhibiting marked variation in habit, foliage and consequently in general appearance. It is, in Japan, the most all round useful softwood timber and in this respect finds an analogue in China in *Cunninghamia lanceolata* Hook. For afforestation purposes Cryptomeria is being planted in enormous quantities on the mountains of Formosa; for like purposes it is being experimented with in many parts of India, Africa and Australia. The only place in which I have seen it flourishing in all these lands was on the rain-soaked outer ranges of the Himalayas in and round Darjeeling.

Subfam. CUPRESSEAE Lindl.

Cupressus L.

Cupressus Duclouxiana Hickel in Camus, Les Cyprès, 91, t. 3, figs. 419–424 (1914).—Dallimore & Jackson, Handb. Conif. 195 (1923).—Stapf in Bot. Mag. CL. t. 9049 (1925).

Cupressus sempervirens Franchet in Jour. de Bot. XIII. 263 (1899), Not Linnaeus.

Cupressus torulosa Rehder & Wilson in Sargent, Pl. Wilson. II. 54 (1914), excluding all references and synonyms.—Hayata in Tokyo Bot. Mag. XXXI. 118 (1917).—Chun, Chin. Econ. Trees, 38, fig. 12 (1922).—Rehder in Jour. Arnold Arb. IV. 125 (1923).—Not D. Don.

YUNNAN: Yangtsze watershed, Prefectural districts of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 3987, May October, 1922; west of Talifu, Mekong watershed, en route to Youngchang and Tengyueh, *J. F. Rock*, no. 6802, September October, 1922; Shweli River drainage basin and environs of Tengyueh, *J. F. Rock*, no. 7921, February, 1923; Lotueshan, mountains of Labako, west of the Yangtsze bend at Shiku, *J. F. Rock*, no. 8440, in 1923; mountains of Londjre, Mekong-Salween watershed, adjoining southeastern Tibet, *J. F. Rock*, no. 11645, in 1923; Yunnanfu, *C. Schneider*, no. 46, February, 1914; Yen-yuan Hsien, Kalapa, alt. 3000

m., *C. Schneider*, no. 3568, May, 1914; between Yungning and Chungtien, alt. 3200 m., *H. Handel-Mazzetti*, no. 7602, August, 1915; without locality, *E. E. Maire;* without locality, *G. Forrest*, no. 8166.

SZECHUAN: valley of the Tung River, alt. 1300–2600 m., *E. H. Wilson*, no. 2106, Veitch Exped. no. 3012, June, July & August, 1908, July, 1904; valley of the Min River, Wa-ssu country, Wen-chuan Hsien, alt. 1600 m., *E. H. Wilson*, no. 798A, November, 1908; near Mao-chou, alt. 1800 m., *E. H. Wilson*, no. 2105, May, 1908.

KANSU: near Chu kun, *F. N. Meyer*, no. 1981, October, 1914.

CULTIVATED: Hort. P. D. Williams, St. Keverne, Cornwall; Hort. Allard, Angers, July, 1922.

Distribution: western Yunnan northward through western Szechuan to southern Kansu, chiefly in arid warm valleys and often cultivated in temple grounds.

Since 1914 I have had the advantage of seeing many trees of the real *C. torulosa* D. Don cultivated in different parts of the world, and now realize that my colleague and I were in error in referring my Chinese material to the Himalayan Cypress. M. Hickel's Chinese species is very distinct and may easily be recognized by its very slender branchlets and large globose and sub-globose cones usually 2–2.5 cm. in diam.; occasionally they are less than 1 cm. long and broad, but this is very unusual. The Himalayan species has smaller cones, always longer than broad, and gray fibrous fissured bark.

Cupressus funebris Endlicher, Syn. Conif. 58 (1847).—Parlatore in De Candolle, Prodr. XVI. pt. II. 471 (1868).—Debeaux in Act. Soc. Linn. Bordeaux, XXX. 110 (Fl. Shangh. 58) (1875).—Masters in Jour. Linn. Soc. XVIII. 496 (1881); XXVI. 540 (1902); XXXVII. 412 (1906); in Jour. Bot. XLI. 268 (1903).—Kanitz in Szèchenyi, Keletazs. Utján. Tudom. Ered. II. 847 (Pl. Enum. 63) (1891); Wiss. Ergeb. Reise Szèchenyi, II. 738 (1898).—Franchet in Jour. de Bot. XIII. 263 (1899).—Pritzel in Bot. Jahrb. XXIX. 219 (1900).—Pavolini in Nuov. Giorn. Bot. Ital. n. ser. XV. 439 (1908).—Henry in Elwes & Henry, Trees Gr. Brit. & Irel. V. 1162 (1910).—Patschke in Bot. Jahrb. XLVIII. 675, t. 8, fig. 6 (1913).—Hayata in Tokyo Bot. Mag. XXXI. 118 (1917).—Chun, Chin. Econ. Trees, 38 (1922).—Rehder in Bailey, Cult. Evergreens, 211, fig. 34 (1923).—Dallimore & Jackson, Handb. Conif. 197, fig. 38 (1923).

Cupressus pendula Abel in Staunton, Embassy to China, II. 265 (1797), name only.—Not Thunberg, nor L'Héritier.

Cupressus funebris gracilis Carrière, Traité Conif. 162 (1867).

YUNNAN: district of Yunnanfu, *O. Schoch*, no. 425 (1916).

DISTRIBUTION: China, widely distributed from the seacoast to the extreme west being especially abundant in the valley of the Yangtsze River.

This is the only specimen we have seen from Yunnan of this common and wide-spread Chinese tree.

Fokienia Henry and Thomas

Fokienia Kawaii Hayata in Tokyo Bot. Mag. XXXI. 116, fig. (1917).
YUNNAN-TONKIN BORDER, *S. Kawai*, January, 1917 (co-type specimen).
DISTRIBUTION: forests of the Yunnan-Tonkin border.
On the above specimen, which is the only one I have seen, the cones are much smaller than those of *F. Hodginsii* Henry & Thomas.

Thuja L.

Thuja orientalis Linnæus, Spec. 1002 (1753).—Rehder & Wilson in Sargent, Pl. Wilson. II. 53 (1914) where full citations of literature and synonymy are given.

Thuja orientalis f. *Kawaii* Hayata in Tokyo Bot. Mag. XXXI. 118 (1917).

YUNNAN: Yangtsze watershed, Prefectural district of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 4660, May–October, 1922; mountains of Londjre, Mekong-Salween watershed, adjoining southeastern Tibet, *J. F. Rock*, nos. 9402, 11646, in 1923; Yuanchang, alt. 2000 m., *A. Henry*, no. 13353; valley of the Mekong, alt. 2050–2200 m., *H. Handel-Mazzetti*, nos. 7983, 7970, September, 1915; without locality, *E. E. Maire;* Yunnanfu, *F. Ducloux*, no. 6251, January, 1909.

SZECHUAN: Lung-chu-shan, *C. Schneider*, no. 850, April, 1914.

DISTRIBUTION: China, exact habitat unknown; long cultivated and escaped, in China, Manchuria and Korea, cultivated in Japan.

In this herbarium there is much material of this tree, but whether collected from escaped and naturalized or really spontaneous specimens we do not know. In my own travels through the Orient I never saw a spontaneous example. It has been cultivated by the Chinese from time immemorial and in by-gone days was a feature of the gardens of princes and the tombs of emperors. At the New Year the fragrant branches are used to symbolize long life and happiness; the fruit and leaves were formerly much used in Chinese medicine. The tree is a favorite with both Taouists, Buddhist and Confucian priests which accounts for its wide spread cultivation in China, Korea and Japan. In Peking may be seen some magnificent specimens planted more than six hundred years ago with enormous burled trunks and flattened rounded, wide-spreading crowns of huge branches.

Libocedrus Endl.

Libocedrus macrolepis Bentham & Hooker, Gen. Pl. III. 426 (1880).—Masters in Jour. Linn. Soc. XVIII. 485 (1881); in XXVI. 540 (1899); in Gard. Chron. ser. 3, XXX. 467 (1901).—Kent in Veitch, Man. Conif. 255 (1900).—Henry in Garden, LXII. 183, fig. (1902); in Elwes & Henry, Trees Gr. Brit. Irel. III. 488 (1908).—Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 207, fig. 4 (Pl. Mont. Formos.) (1908).—W. in Gard. Chron. ser. 3, XLIV. 148 (1908).—Beissner, Handb. Nadelholzk. ed. 2, 493 (1909).—Henry and Thomas in Gard. Chron. ser. 3, XLIX. 67, fig. 34 (1911).—Kanehira, Formos.

Trees, 602, fig. (1917).—Chun, Chin. Econ. Trees, 34 (1922).—Rehder in Bailey, Cult. Evergreens, 221 (1923).—Dallimore & Jackson, Handb. Conif. 305 (1923).

Calocedrus macrolepis Kurz in Jour. Bot. XI. 196, t. 133, fig. III. (1873).
Thuja macrolepis Voss in Mitt. Deutsch. Dendr. Ges. XVI. 88 (1907).

YUNNAN: Talang, alt. 1600 m., *A. Henry*, no. 11566; Szemao, alt. 1400 m., *A. Henry*, nos. 11566A, 11566B.

DISTRIBUTION: mountains of northern Formosa and of southwestern Yunnan.

This Libocedrus appears to be a rare tree in Yunnan and confined to rather low altitudes. On my visit to Szemao in 1899 I saw several trees but none of any size. In general appearance they strongly resemble the Chinese Arbovitae (*Thuja orientalis* L.). From one tree on the outskirts of Szemao I obtained good seeds which I sent to Messrs. Veitch with whom they germinated in 1900. None of the collectors in northwest Yunnan have sent back material of this tree and it would appear to be confined to the southwestern part of the province. In Formosa the range of this tree is from the central parts northward, between elevations of from about 150 to 1500 m. but it is nowhere common. Where I saw the tree in 1918 was in mixed evergreen broad-leaf forests beyond Urai in the Taihoku prefecture. There it is extremely rare but some distance to the northwest it is said to be more plentiful, but today the Libocedrus is certainly not a common tree in Formosa. Those I saw were growing on the face of cliffs or on the edge of sharp rock ledges in almost inaccessible places. The largest tree was about 70 ft. tall with a trunk 10 ft. in girth but I saw stumps of felled trees from 16 to 18 ft. in girth. In these forests it is never a striking nor a handsome tree. The crown is broad, more or less flattened but rather sparse, made up of several thick main branches and many thin branches of secondary order. The branches are spreading, horizontal or slightly ascending. The wood is fragrant, with very narrow annual rings and the sap wood merges into the heart wood without any sharply defined color distinction. The sap wood is pale yellowish to brownish, the heart wood is darker in shade. In texture it is close-grained and elastic. It is easily worked and when smoothed by a plane becomes lustrous. It is very durable, especially underground, and is not attacked by Termites. Its specific gravity is 0.62 to 0.69. For cabinet-work, furniture, and interior fittings, Libocedrus wood is the best and most valuable produced in Formosa. The sawdust is used in the manufacture of incense sticks and the bark is valued for roofing purposes. Until about 1908 this most valuable tree was quite common in the forests of the Taihoku prefecture.

Juniperus L.

Sect. OXYCEDRUS Spach.

Juniperus formosana Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 209, t. 38 (Fl. Mont. Formos.) (1908); Icon. Pl. Formos. VII. 39, fig. 25

(1918).—Henry in Elwes & Henry, Trees Great Brit. & Irel. VI. 1415 (1912).—Bean, Trees Shrubs Brit. Isles, I. 672 (1914).—Rehder & Wilson in Sargent, Pl. Wilson. II. 56 (1914).—Kanehira, Formos. Trees, 600, fig. (1917).—Chun, Chin. Econ. Trees, 41 (1922).—Rehder in Jour. Arnold Arb. IV. 126 (1923); in Bailey, Cult. Evergreens, 197 (1923).—Dallimore & Jackson, Handb. Conif. 247 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. ed. 2, 31, fig. (1923).

Juniperus taxifolia Parlatore in De Candolle, Prodr. XVI. pt. II. 481 (1868), as to Fortune's specimen no. 47.—Pritzel in Bot. Jahrb. XXIX. 219 (1900).—Beissner in Bull. Soc. Bot. Ital. 1901, 360.—Masters in Jour. Linn. Soc. XXVI. 543 (1902); XXXVII. 413 (1906); in Jour. Bot. XLI. 268 (1903).—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, XXII. 403 (Enum. Pl. Formos.) (1906).—Patschke in Bot. Jahrb. XLVIII. 678 (1913), in part.—Not Hooker & Arnott.

Juniperus rigida Beissner in Nuov. Giorn. Bot. Ital. n. ser. IV. 186 (1897).—Franchet in Jour. de Bot. XIII. 264 (1899).—Masters in Jour. Bot. XLI. 268 (1903); in Jour. Linn. Soc. XXXVII. 413 (1906).—Patschke in Bot. Jahrb. XLVIII. 678 (1913), in part.—Not Siebold & Zuccarini.

Juniperus communis Franchet in Jour. de Bot. XIII. 264 (1899).—Not Linnaeus.

Juniperus Mairei Lemée & Léveillé in Monde des Pl. 1914, 20.

YUNNAN: high plateau between Talifu and Likiang to the foot of the Likiang Snow range, *J. F. Rock*, no. 3243, May 6–11, 1922; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, no. 3630, May–October, 1922; Mountains south of Likiang, Sungkwe Hochin Range, *J. F. Rock*, nos. 8297, 11680, in 1923; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 11475, in 1923–24; between Talifu and Likiang, alt. 2000–2600 m., *H. Handel-Mazzetti*, no. 6438, May, 1915; Tcheou-kia-ouan, alt. 2990 m., *E. E. Maire*, April; Suen-oui, alt. 2600 m., *E. E. Maire*, August.

SZECHUAN: between Liuku and Kuapu, alt. 2800 m., *C. Schneider*, no. 1319, May, 1914; Yen-yuan Hsien, Kalapa, alt. 3000 m., *C. Schneider*, no. 1242, May, 1914; between Oti and Ouen-tin, alt. 2800–3200 m., *C. Schneider* no. 1182, June, 1914.

DISTRIBUTION: mountains of Formosa and of China throughout the warmer parts from the eastern sea-board to the extreme west.

In Kansu and some of the extreme northern parts of China the black-fruited *Juniperus rigida* S. & Z. has been recently collected by R. C. Ching (nos. 93, 101), but throughout all the warmer parts *J. formosana* appears to be the only member of the section *Oxycedrus* Spach indigenous there. Messrs. Rehder & Wilson have discussed this species and the material before me adds nothing to what they have written.

Sect. SABINA Spach

Juniperus squamata Buchanan-Hamilton apud Lambert, Descr. Gen. Pinus, II. 17 (1824).—D. Don, Prodr. Fl. Nepal. 55 (1825). Spach in Ann. Sci. Nat. sér. 2, XVI. 293 (1841).—Endlicher, Syn. Conif. 18 (1847).—Brandis, For. Fl. Brit. Ind. 537 (1874).—Henry in Elwes & Henry, Trees Great Brit. & Irel. VI. 1420 (1912).—Rehder & Wilson in Sargent, Pl.

Wilson. II. 57 (1914).—Rehder in Bailey, Cult. Evergreens, 199 (1923).—Dallimore & Jackson, Handb. Conif. 260 (1923).

Juniperus religiosa Royle, Ill. I. 351 (1839), name only.
Juniperus Lambertiana Wallich mss. ex Endlicher, Syn. Conif. 19 (1847), as a synonym.
Juniperus rigida Wallich mss. ex Endlicher, Syn. Conif. 19 (1847), as a synonym.
Sabina squamata Antoine, Cupress. 66, t. 90 (1857), in part.
Juniperus recurva β. squamata Parlatore in De Candolle, Prodr. XVI, pt. II. 482 (1869).—Hooker f., Fl. Brit. Ind. V. 647 (1888).—Masters in Jour. Linn. Soc. XXVI. 543 (1902); XXVII. 413 (1906); in Jour. Bot. XLI. 268 (1903).—Patschke in Bot. Jahrb. XLVIII. 678 (1913).
Juniperus recurva Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 102 (Pl. David. I. 292 (1884); in Jour. de Bot. XIII. 263 (1899).—Beissner in Nouv. Giorn. Bot. Ital. n. ser. IV. 186 (1907).—Pritzel in Bot. Jahrb. XXIX. 219 (1900).—Patschke in Bot. Jahrb. XLVIII. 678 (1913), in part.—Not Buchanan-Hamilton.
Juniperus recurva var. *densa* Hort. Kew, 1880 (in Herb. Arnold Arb.); probably not Carrière.
Juniperus morrisonicola Hayata in Gard. Chron. ser. 3, XLIII. 194 (1908); in Jour. Coll. Sci. Tokyo, XXV. art. 19, 211, fig. 7 (Fl. Mont. Formos.) (1908); XXX. art. 1, 307 (1911); in Jour. Linn. Soc. XXXVIII. 298 (1908).

YUNNAN: Drainage basin of Erhhai (Lake of Talifu), Tsangshan Range, *J. F. Rock*, nos. 3147, 3150, April, 1922; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, alt. 3000–4600 m., *J. F. Rock*, nos. 3434, 3452, 3453, May–October, 1922; between Lanping and Kau-ho-ten on Yun-lu-shan, alt. 3300 m., *J. F. Rock*, no. 8155, March, 1923; without precise locality, alt. 2900–3200 m., *C. Schneider*, no. 3420, August, 1914.

SZECHUAN: Liuku, alt. 3800–4000 m., *C. Schneider*, no. 1313, May, 1914; Huali, alt. 4200 m., *C. Schneider*, no. 1411, May, 1914; Ta-ching, Ta-yung-pu, alt. 3500 m., *C. Schneider*, no. 4131, May, 1914.

DISTRIBUTION: Mountains of Formosa westward on the higher mountains of China to the central Himalayas.

This variable species is apparently abundant on the higher mountains of Yunnan as it is elsewhere in central and western China.

Juniperus squamata var. **Fargesii** Rehder & Wilson in Sargent, Pl. Wilson. II. 259 (1914).—Rehder in Jour. Arnold Arb. IV. 126 (1923); in Bailey, Cult. Evergreens, 199 (1923).—Dallimore & Jackson, Handb. Conif. 260 (1923).

YUNNAN: Mount Lauchunshan, southwest of Yangtsze bend at Shiku, alt. 3300 m., *J. F. Rock*, nos. 8377, 8378, in 1923; Yunnanfu, *C. Schneider*, no. 57, February, 1914; without locality, *G. Forrest*, no. 8268.

SZECHUAN: Hui-li-chou, alt. 3500 m., *C. Schneider*, no. 565, March, 1914.
DISTRIBUTION: mountains of central and western China.

Juniperus squamata f. **Wilsonii** Rehder in Jour. Arnold Arb. I. 191 (1920); IV. 126 (1923); in Bailey, Cult. Evergreens, 200 (1923).

YUNNAN: between Lanping and Kao-ho-ten, alt. 3300 m., *J. F. Rock*, no. 8154, March 1923; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 3568, May–October, 1922; same locality, alt. 2900–3200 m., *C. Schneider*, no. 3305, October, 1914; district of Chung-tien, alt. 3700–3900 m., *H. Handel-Mazzetti*, no. 4643, August, 1914; without locality, *G. Forrest*, no. 10496.

SZECHUAN: Ning-yuan-fu, Lo-tieh-shan, alt. 4200 m., *C. Schneider*, no. 910, April, 1914; between Wololio and Hunka, alt. 3300 m., *C. Schneider*, no. 3896, June, 1914.

DISTRIBUTION: high mountains of Formosa and of western China.

Schneider's nos. 3305 and 3896 have fruits larger than is usual in the species.

Juniperus recurva Buchanan-Hamilton apud D. Don, Prodr. Fl. Nepal. 55 (1825).—Loudon, Arb. & Frut. Brit. IV. 2504, fig. (1838).—Endlicher, Syn. Conif. 18 (1847).—Griffith, Notul. IV. 26 (1854); Icon. Pl. Asiat. IV. tt. 373–374 (1854).—Hooker f., Himal. Jour. II. fig. facing p. 51 (1854); Fl. Brit. India V. 647 (1888), excluding synonym.—Parlatore in De Candolle, Prodr. XVI. pt. II, 481 (1868).—Brandis, Forest Flora Brit. Ind. 536 (1874); Indian Trees, 694 (1906).—Gamble, Ind. Timbers, 412 (1881).—Masters in Gard. Chron. n. s. XIX. 468 fig. 69 (1883).—Kent in Veitch, Man. Conif. 185, figs. 57, 58 (1900).—Clinton-Baker, Ill. Conif. II. 75, t. facing p. 74, fig. 1 (1909).—Elwes & Henry, Trees Gr. Brit. & Irel. VI. 1419, t. 349 (1912).—Bean, Trees Shrubs Brit. Isles, I. 674, t. (1914).—Rehder in Bailey, Cult. Evergreens, 200 (1923).—Dallimore & Jackson, Handb. Conif. 255 (1923).

Sabina recurva Antoine, Cupress. 67, t. 88, fig. e–m, t. 91 (1857).

Juniperus recurva var. *a. typica* Patschke in Bot. Jahrb. XLVIII. 776 (1913).

YUNNAN: between Tengyueh and Likiangfu, via Shweshanting, Kantingai Feilungkiao-Yunlung, Lanping, Cheinchuan and Likiang, alt. 3300 m., *F. J. Rock*, no. 8156, March, 1923; mountains above Tseku and Tsechung, Mekong-Salween watershed, *J. F. Rock*, no. 8821, in 1923; Mekong valley alpine regions round Yetche, *J. F. Rock*, no. 9066, May, 1923; Salween Valley, border of Tsarong, Tibet, alt. 2600–2900 m., *J. F. Rock*, no. 11495, in 1923; Yangtsze-Mekong watershed, alt. 3600–4050 m., *H. Handel-Mazzetti*, no. 8842, June, 1916.

DISTRIBUTION: Himalayas eastward to the high mountains of northwestern Yunnan.

The fruit of the Yunnan material is rather smaller than that on specimens from Sikkim with which it otherwise agrees. Yunnan is a new station for the range of this species which heretofore has not been authentically known from China. The material referred by Masters (in Jour. Linn. Soc. XXVI. 542 (1902)) to this species belonging to *J. squamata* Buch.-Ham. According to Rock's field notes this Juniper varies from a low shrub to a small tree 15 ft. tall.

Juniperus Wallichiana Hooker f. apud Parlatore in De Candolle, Prodr. XVI. pt. II. 482 (1868).—Brandis, Forest Fl. Brit. Ind. 537 (1874); Indian Trees, 695 (1906).—Gamble, Manual Ind. Timbers, 412 (1881).—Henry in Elwes & Henry, Trees Gr. Brit. & Irel. VI. 1423 (1912).—Clinton-Baker, Ill. Conif. III. 32, t. (1913).—Rehder in Bailey, Cult. Evergreens, 202 (1923).—Dallimore & Jackson, Handb. Conif. 266, fig. 61 (1923).

Juniperus pseudosabina Parlatore in De Candolle, Prodr. XVI. pt. II, 482 (1868), in part.—Hooker f. Fl. Brit. Ind. v. 646 (1888).—Beissner, Handb. Nadelholzk. 106 (1891), in part.—Not Fischer & Meyer.

Juniperus Wallichiana var. *meionocarpa* Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 26, p. 1 (Anzeig. Akad. Wiss. Wien. 1924, no. 14) (1924).

YUNNAN: Mount Lauchunshan, southwest of the Yangtsze bend at Shiku, *J. F. Rock*, no. 8387, in 1923; Lotueshan, mountains of Labako, west of the Yangtsze bend at Shiku, *J. F. Rock*, no. 9559, in 1923; Mount Peimashan, Mekong-Yangtsze divide between Atuntze and Pungtzera, *J. F. Rock*, nos. 8837, 11353, in 1923; Mountains of Moting, northeast of the Yangtsze-Mekong watershed, *J. F. Rock*, no. 9336, June, 1923.

DISTRIBUTION: Himalayas from Chamba and Almora eastward through Nepal and Sikkim to the mountains of northwestern Yunnan.

Dr. Handel-Mazzetti was the first to record this species from China though he would refer the specimens to a distinct variety based on the upright or ascending fruit, but I do not see how they differ from material collected in Sikkim and on other parts of the Himalayas. According to Rock this is sometimes a tree from 50 to 75 ft. tall with a trunk as much as 4 ft. in diameter. All the specimens before us are in fruit and there are no juvenile leaves. The branches are markedly tetragonal and the arrangement of the leaves on the ultimate branches is, with rare exceptions, opposite and decussate, very occasionally are they ternate. The gland on the back of the leaf is very marked and the apex of the leaf is incurved. The blue-black, ovoid, one-seeded fruit is about 1 cm. long and obtuse at the summit. I think it best to keep this Himalayan Juniper distinct from the Altai and Turkestan plant named *Juniperus pseudosabina* by Fischer & Meyer. There is material in this herbarium from Kansu which I believe belongs to Fischer & Meyer's species. In this the adult branchlets are less quadrate, the leaves on the ultimate branchlets are ternate and not so thick, and the fruit is oval.

To *J. Wallichiana* Hook. f. probably belongs the material collected by E. E. Maire at 3200 m. altitude on the Ta-hai-tse plateau in May, 1912, and by Léveillé (in Monde des Pl., 1914, 20) referred to *J. tamariscifolia* Ait., a species that is not known to grow in China.

Juniperus chinensis Linnaeus, Mant. 127 (1767).—Rehder & Wilson in Sargent, Pl. Wilson. II. 60 (1914) where full references to literature and synonymy will be found to date.—Hayata in Tokyo Bot. Mag. XXXI. 115 (1917).—Chun, Chin. Econ. Trees, 40 (1922).—Rehder in Jour. Arnold Arb. IV. 127 (1923); in Bailey, Cult. Evergreens, 203 (1923).—Dallimore & Jackson, Handb. Conif. 237, fig. 51 (1923).

YUNNAN: high plateau between Talifu and Likiang to the foot of the Likiang Snow Range, *J. F. Rock*, no. 3278, May, 1922; Yunnanfu, cultivated, *C. Schneider*, no. 51, February, 1914; Pan-long-se, alt. 2990 m., *E. E. Maire*.

DISTRIBUTION: northeastern Asia, Japan, Korea, Manchuria and China. Often cultivated in gardens and planted among tombs and in temple grounds.

NOTES.

The Arnold Arboretum expedition to North Central Asia.[1]—From two letters recently received from Mr. Rock, the following extracts are of general interest, describing as they do an almost unknown region and the hardships and difficulties it presents for exploration.

"High plateau of the Kokonor, Oct. 9, 1925

"We have been on the Kokonor plateau for some time and as the Dulanssu (on the map Dulankit) trip proved a very arduous and disappointing one, I decided to give it up and we made our way back to the lake (Kokonor) crossing the sand dunes and thence up a gorge known as the Rako gorge. Looking for trees or even shrubs on the Kokonor is like looking for a needle in a haystack. At Rako, where there are Tibetan and Mongolian encampments (nomads), we found two species of Picea and quite a number of shrubs including Rhododendrons. I was very much surprised to find Rhododendrons so far north. We thence made our way across the Tapanshan, a high range part of the Nanshan, not a tree in sight, but several bushes, including three species of Rhododendrons at 12500 ft. elevation. They grow only on the northeastern slopes of the range where the snow does not melt. Not a single bush could be seen on the southwestern slope which receives the afternoon sun and where there is no snow. This range is the divide between the central Asian plateau and the Yellow River and is a formidable barrier. At Komangssu, called by the Tibetans Serku gombo, and not on any map, we found extensive forests of a single species of Picea, which reaches a height of over 100 ft. with trunk two feet in diameter. A tree 1½ ft. in diameter had 119 rings. The tree resembles much *Picea Meyeri;* there is a slight pubescence on the slender branchlets, the needles are less robust and the cones much smaller. The bark is the same as found on *Picea Meyeri* in the Tebbu country. We collected quite a quantity of seed, which I shall forward from Kanchow in the north later on with a number of seeds of various Berberis, Cotoneaster, Clematis, Lonicera, etc., which formed the underbrush; in this Picea forest only this one species occurs and forms extensive forests. Komangssu is one stage from the Tapanshan. We are again in Tibetan grass country camping. It is bitterly cold, the temperature in my tent has been 27° Fahrenheit, and fire is impossible. No charcoal could be bought, not even in Lanchow, where they burn coal. It has been snowing now for a night and a day, and while I write this the snowflakes are whirling down from a dull sky. Camping under such conditions, with no other fuel than Yak dung, and that now soaked with snow, is very trying indeed. Yak dung is difficult to find now as the plain is covered with snow, all the grass is hidden and the animals are having a hard time; we carry beans for the horses and mules, but grass is an essential. We hope it will clear shortly and so we will be able to proceed, otherwise we would have to go south to Peitating, a forlorn walled village, the last place where cultivation is carried on, to remain until the weather clears. We have one high pass yet to cross ere we reach the main Nanshan, which separates us from Kanchow and of which the Richthofen range is a part. I sent you various seeds from the Kokonor region which I sent to Tankar to be mailed. I hope you will have received them

[1] See Vol. VI, 213

before this. There are snow ranges on both sides of us, but they are as bare as a rock, not a vestige of plant life is visible. The scarcest thing in this country is a tree or a bush, everything is barren, and searching for such is indeed an undertaking. The Kokonor region is the bleakest imaginable. Cold winds blow from the Northwest almost continually and my tent, elev. 10700 ft., was nearly blown into the lake one night at 2 a. m. had my men not come speedily to my rescue. It blows a veritable gale up there beginning at 10 p. m. and lasting until after 2 a. m. The nomads camp at the very foot hills in sheltered nooks, but when travelling one cannot go very far off the trail, as it would consume a good deal of time every day. The Kokonor region is indeed poor picking for a botanist but rich in bird life. I never saw so many birds in one region as on the Kokonor, we made a large collection, and I suppose the Doctor will be glad to hear about this. I have been told by Tibetans that there are forests to southwest of Kanchow which corresponds to the Richthofen range which name is of course not known here. We shall reach the range in about 8 or 10 days, providing the weather clears and the sun melts the snow, as it must, as it is much too early for the real winter to set in, this being only the 9th of October. Once while camping on the Kokonor (lake) our camp was visited by Tibetan robbers, sneak thieves, in the night, but they were chased off by our Mohammedan soldiers, without whom it would be impossible to travel in this part of the world. General Machi detailed for me an old hardy Moslem soldier, who knows this region exceedingly well, and who is always out on the plains. He and ten soldiers, Moslems, escorted the Panchen Lama from Taichinere in the northern Tsaidam, to Suchow and Kanchow. He is a remarkable man, absolutely fearless and the Tibetans know him. The chiefs of the various nomad clans pay him great deference. He is to go with me to the Amne Machin next year; he has been there four times and speaks the Ugolok language as well as Tibetan. When travellers or geographers speak of the forests of the Kokonor, they can mean no other than the forests on the upper Yellow River, viz. the Amne Machin and below, for there are no forests north of the Amne Machin. General Peirera, whose journal I have, speaks of not seeing either a shrub or a tree until he reached Jekundo, 18 stages from Tankar, and Jekundo is in Eastern Tibet and not in the Kokonor. It is true huge logs are rafted down the Yellow River to Lanchow, but they all come from the upper Yellow river, that is the forests of the Amne Machin. I found out that at Dulanssu was only a grove of trees, one species of spruce and one of oak, facing a monastery. People used to bare hills are apt to call a grove of trees a "ta lin ku" or large forest of big trees. Of all the regions of Kansu that I have seen so far, there is none that can compare with the Tebbu country, which is a perfect paradise for a botanist or a dendrologist. The mountains of Sining and the huge divide between the Sining and the Yellow River are absolutely bare of trees, not even shrubs are visible, and Farrar could only have been out for flowering plants such as Primulas, Meconopsis, etc., which are apparently plentiful in the early summer."

Kanchow, Oct. 25, 1925

"After much hunting for trees we reached Kanchow on the Mongolian border, to replenish our provision boxes, to buy beans for the horses, etc. From our camp in the snow, whence the previous epistle was written, we proceeded to Obo and thence went west between the North Kokonor barrier range and the Richthofen range. Obo is a dot in a sea of grass where live a few Mohammedans who buy wool from the Tibetans. Nothing could be bought there as they bring their own supplies up either from Sining or down from Kanchow. A stream flows between these two mighty snow ranges, both called the Nanshan by the Chinese, the northern one facing the North Kokonor barrier range being our Richthofen range. The mountains for four days journey were absolutely bare. The grass country between the ranges being dotted here and there by Nomads. We came on to a Tibetan nomad wedding and it seemed so absurd in this wild country to see the women dressed in the finest and overladen with silver jewelry, the furs they wore were exquisite. I finally spied in a deep rocky gorge a dying forest of spruce and we went directly thither and pitched our camp. It was indeed a dying forest.

The nomads had been cutting and cutting; we secured only a few seeds here. We were told by the nomads that on a mountain further west called Ngiusinshan, and on which a Mongol tent lamassery, Arketassu, is situated, are to be found extensive forests. We made our way to Arketassu and pitched our tents on the edge of the mighty spruce forests. The most extensive forest was on this huge mountain 18000 ft. in height, but strange to say it consisted of a single species of Picea. We camped there several days and searched the mountain up and down, but everywhere we were greeted by the same species. Above the spruce forest, which extends to 11500 ft. (stunted trees) there is only willow scrub 3 ft. tall, stiff Caragana and *Potentilla fruticosa* bushes, no Abies. On the North Kokonor barrier range facing the Richthofen range there grows a Juniper of a fairly large size; it takes the place of Abies above the Picea forest. We went on and on following the Babo ho where it is joined by a stream coming from the mountains north of the Karanor, called the Heho. There we found forests but the same species of Picea. We collected specimens naturally for comparison but every tree is alike. We followed the Babo ho as far as we could. It becomes a big river, cuts through the Richthofen range and out to the plain west of Kanchau. The stream zigzagged and was unfordable. It entered a gorge about 7000 ft. deep and disappeared between snow-capped mountains. It was impossible to proceed further, no trail, no nomads, nothing but rocky cliffs with Juniper trees. The hills were now bare and composed of Red Sandstone. We returned. The North Kokonor barrier range and the Richthofen join here in one mighty mass of bare ranges through which the river has cut its way. We impressed a nomad Tibetan to guide us across the mountain, which separates us from the plains of Mongolia. For four days we wandered over the mountains, down gorges, and up passes, sleeping as high as at 12500 elevation, with a temperature of 6° Fahr. in the tent and not a stick of wood, as we could only take enough along, when we did find any, to cook two meals a day. On the northern slopes, in a rocky gorge which we deseended on to the plain, the Hung shui k'ou, we found Picea forests, but only small trees, perhaps the locality had something to do with the size. They grew on rocky dry slopes, but appeared to be the same species as found on the North Kokonor barrier range and on Ngiusinshan. These Picea forests have no under-shrubs whatever, moss-covered ground and are pure stands of a single species. I have many photographs to illustrate this region. We shall continue west; there are large tracts of forest and I shall satisfy myself in regard to the trees of which they are composed and shall of course collect the seeds. It will not be possible to go the whole northern length or rather to the extreme west of the Richthofen range on the northern slopes this year, as it is getting too cold and camping at such altitudes in such a latitude, exposed to the cold winds of the Mongolian desert, is more than I can at present endure. Had political circumstances permitted my coming here earlier all could have easily been done, but fates were against us. This region is terribly expensive, grass or hay is sold by the pound. It is also difficult to hire animals to go to these out of the way places, as the muleteers are used to travel only on the big roads from inn to inn. It is hard on the animals to spend night after night out in the open, in snow and ice, with a temperature as low as 2 and 4° Fahrenheit, and with inadequate fodder, as often one is forced to camp where there is no grass. Camels cannot go where there is ice and steep hillsides, as they slip easily and break their legs, so it is quite a problem, and the only way I could get mulemen to go was to commandeer them through the officials, and then state we are going there and there, and finish by saying no word can be said and they must go. They whine continuously then and groan, so it gets on one's nerves, and to make things unpleasant they go so slow, one is glad to get rid of them when possible. They are all alike."

Rubus Chingii Hu. —On page 141 of vol. VI. of this Journal the name **Rubus Chungii** should be changed to **Rubus Chingii.** The species was named in honor of Mr. Ren-Chang Ching who first collected it.

TREE IN CENTRAL PARK

Tree in Central Park, Palms

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THUJA ORIENTALIS LINNAEUS

Plate 1.

ERNEST H. WILSON

ONE of the oldest and best known exotic trees in cultivation is *Thuja orientalis* L., the Chinese Arbor-vitae. It was named by Linnaeus in 1753 but he had earlier described it in his Hortus Cliffortianus (p. 449) in 1737, where he states that it was communicated by Cl. Royen. Philip Miller had it in cultivation in the Apothecaries' garden at Chelsea before 1752 and in the seventh edition of his Gardeners' Dictionary states that "The China Arbor Vitae hath not been long in Europe: the Cones of this Tree were sent from China, by some of the French Missionaries; and since this Sort has been introduced into the English Gardens, it has been greatly propagated by Layers and Cuttings; but the Seeds seldom ripen here." The first mention of it in European literature is to be found in Kaempfer's Amoenitates, fasc. v. 884 (1712) under the name of "Fi no ki altera." Whether Royen received it through the Dutch East India Company or whether Miller's version of its introduction is correct I have not been able to discover. In Japan it is commonly cultivated in temple grounds and might easily have been sent direct to Holland by way of Java either as a living plant or as seeds. On the other hand it is abundantly planted in and around Peking and ripe cones, as Miller states, may easily have been sent to France by some Jesuit priest since the first of this order, the famous Matthaeus Ricci, settled in Peking in 1600 and the order has been represented there ever since.

Although known in Europe for nearly two centuries I can find no record of large trees or indeed of specimens showing the real habit of the tree. This is all the more remarkable when its accommodating nature and ease of propagation are remembered. Dozens of forms have originated in gardens and received names, yet a real adult tree seems unknown either in America or in Europe. The books devoted to Conifers, even the very latest, describe it as a bush or tree of columnar or pyramidal habit with erect branches and branchlets and from 20 to 60 ft. tall is given as its height. This description faithfully portrays the tree as we of the West know it, but is far, very far from picturing its real habit. Slow of growth it takes centuries for this tree to obtain its mature form.

During my travels in the Orient I did not see spontaneous specimens

of the Chinese Arbor-vitae, widely cultivated though it is and in many places naturalized. In Korea and Japan it is known only as a planted tree. Its hardiness supports the belief that it is a native of northern China rather than of other parts of the Empire. It is the Poh-tree of the Chinese classics and the fruit, the leaves and the inner bark all have medicinal uses. In the temples the branchlets and pieces of the wood are burnt as incense. In former days the tree distinguished the gardens of princes and sheltered the tombs of emperors, and today it is most commonly met with in gardens and burial grounds. Throughout the New Year festivities, sprays of this fragrant evergreen are used to symbolize long life, happiness and prosperity.

According to J. Hers (in China Jour. Sci. & Arts, IV. 81 [1926]) this Thuja in north China likes low altitudes and is never found at more than 1000 m. above sea level. On the plains together with *Populus tomentosa* Carr., *Ulmus pumila* L. and *Salix Matsudana* Koidz. it constitutes eight-tenths of the flora around villages and in graveyards. Here and there throughout north China magnificent planted specimens of this tree may be seen. Hers (l. c.) states that the most famous specimens he has seen are the Sung Yang Kung Thujas at the foot of Sungshan, one of which was already famous at the time of the Han dynasty (B.C. 255–A.D. 221) and that at Tsin Sze, near Taiyuan Fu, which is supposed to date from the Chow dynasty (B.C. 1122–256). He figures one of the giant Thujas in the Sung Yang Temple with a girth of 38 ft. and states that at Wang Kwai Chen on the Tingchow road to Wutai Shan, there is another very beautiful specimen which is about 10 m. in girth at the base. In Peking, notably in the grounds of the Confucian Temple, in what is now termed the Central Park and at the Temple of Agriculture, there are fine avenues and many magnificent specimens of this Thuja. I have been to some pains to find out the age and history of these trees.

In reply to an inquiry Dr. John C. Ferguson of Peking, an esteemed correspondent of the Arnold Arboretum, informs me that "it is very difficult to give information which might be considered scientifically accurate in regard to the trees in the Temple of Confucius. There are, however, certain well-known facts. This Temple was built during the Yuan (Mongol) dynasty and, in accordance with the custom, trees were planted at that time. The local tradition is that the trees now remaining in the main courtyard were all planted when the Temple was built during the Yuan dynasty with the exception of one tree which is said to have been already there and which must therefore belong to the Sung dynasty. The earliest dated tablet in the Temple enclosure was erected in the 11th year of the Emperor Ta Te, i. e. A. D. 1307. As to the trees growing in the park near the palace (Central Park) there is no means of determining their age further than that we know that the oldest of them could not have been planted earlier than the reign of the Emperor Yung Lo of the Ming dynasty, A. D. 1403–1425."

Dr. Carl TenBroeck of the Peking Union Medical College, writing under date of January 27, 1926, gives the following data gathered by one of his assistants from a book, Ju Hsia Chiu Wen K'oa (Old Stories Under the Sun), published about 1800 which is really a collection of references to Peking gathered from old literature:

"There is a definite record of the establishment of the Confucian Temple in the Kin dynasty 1151. There is a further record of various improvements being made about 1434 and a definite statement of 20 trees being planted at this time. The trees there are evidently of two ages and it is possible that the older trees were planted soon after the establishment of the temple. We cannot, however, make a definite statement about this. We have not found any record of when the trees were planted in the Central Park. Kublai Khan, 1279, built palaces and parks and these were rebuilt by Yung Lo shortly after 1400. Just when the trees were planted we cannot say. The first record of the Temple of Heaven that my man has found shows that it was erected by the Kins about 1200. There is a definite record of its having been rebuilt and enlarged the alterations being completed in 1395 at which time Pines and Cypress (Thuja) were planted."

In the past many cities have occupied the present site of Peking. The Hanlin or Imperial Academy was established there about A. D. 755. The Sung dynasty, which lasted from A. D. 970 to 1260, was driven from Peking in 1118 by the Tartars who established themselves there as the Kin dynasty, only to be driven out by the Mongols in 1234. The famous Emperor Kublai Khan made Peking his capital in 1264 and there the great Venetian, Marco Polo, served him as Advisory Minister.

Through the kindness of Dr. W. T. Councilman, the Arnold Arboretum is in possession of a fine set of photographs of these ancient Thuja trees in Peking and this collection has been supplemented by some excellent photographs generously presented by Dr. TenBroeck who also supplies measurements taken with a surveying instrument. The largest tree photographed by Dr. TenBroeck stands in Central Park and measures 47 ft. 4 inches in height with a trunk 18 ft. 9½ inches in girth at breast height and a crown spreading 48 ft. One in the Confucian Temple is 41 ft. 10 inches in height with a trunk 16 ft. 1 inch in girth and a crown spreading 45 ft. 6 inches. Another in the grounds of the Temple of Heaven is 46 ft. 7 inches in height, with a trunk 12 ft. 6 inches in girth, and a crown spreading 47 ft. 8 inches. The tallest tree measured by Dr. TenBroeck is in Central Park and stands 51 ft. 6 inches high with a trunk 14 ft. 3 inches at breast height. One of Dr. Councilman's pictures shows a tree larger than any of the above, but, unfortunately, no measurements are given. These ancient trees have enormous, massive, contorted branches spreading horizontally and forming open, flattened, rounded crowns. The trunks are clothed with fibrous fissured bark, gray without and red-brown within, and some of them are richly embellished with large and small

burls of fantastic shapes. Nothing could be more unlike the tree we know in western gardens than these old monarchs beneath which Marco Polo may well have rested and found shade during his sojourn at the Khan's court.

LIGNEOUS PLANTS COLLECTED IN NEW CALEDONIA BY C. T. WHITE IN 1923

INTRODUCTORY NOTE

C. T. White
Government Botanist, Brisbane, Australia

Early in 1923 Prof. Sargent wrote and asked me if I would undertake to make a brief trip to New Caledonia to obtain specimens of the ligneous plants of the island for the herbarium of the Arnold Arboretum. The whole of October and the early part of November were consequently spent in the field.

On arrival at Noumea I was fortunate in getting in touch with Monsieur I. Franc, a local schoolmaster, who has spent a considerable part of his vacational periods in collecting plants in various parts of New Caledonia, particularly in the neighbourhood of Prony. Subsequently, I was able to obtain from him a very large number of duplicates from his herbarium.

The flora of New Caledonia possesses great interest for the Australian botanist owing to its closest affinities being undoubtedly with those of eastern Australia, particularly Queensland and northern New South Wales. This affinity is represented by at least one family—the Balanopsidaceae—and several genera, e.g. Argophyllum (Saxifragaceae), Callistemon (Myrtaceae), Callitris (Pinaceae), Duboisia (Solanaceae), Fontainea (Euphorbiaceae), Halfordia (Rutaceae) and Kermadecia (Proteaceae) common to the two countries and found nowhere else. Some comparatively large genera common to the two countries though not absolutely confined to them, find their greatest development in them. A case in point is Hibbertia (Dilleniaceae) of which 110 species are known, 89 are found in Australia and 19 in New Caledonia leaving only 2 species, these last being found in Madagascar. A striking feature of the New Caledonian species is their aborescent habit, most of the Australian forms being dwarf undershrubs little more than herbaceous.

Among the capsular-fruited Myrtaceae are several genera common in the respective flora of Australia and New Caledonia and finding a more limited development outside, e.g. Baeckea, Melaleuca, Tristania and Xanthostemon.

The Proteaceae are well represented in both countries, and genera common to both are Grevillea and Stenocarpus. The former genus contains about 180 species, one of which occurs in New Guinea, 14 in New Caledonia and the remainder in Australia. Two of the Australian species also extend to New Guinea. Stenocarpus, on the other hand, finds its

greatest development in New Caledonia. It contains 24 species, one of which is found in New Guinea, 5 in Australia and the remaining 18 in New Caledonia. A marked difference between the Australian and New Caledonian species is that the latter are xerophytic in character and are prominent features of the scrubby serpentine flora; the former, on the other hand, are large timber trees, natives of the rain-forests of the coastal belt.

A feature of the flora of New Caledonia is the extraordinary development of the closely allied families Saxifragaceae and Cunoniaceae, particularly the latter. The members of both are outstanding plants of the dry scrubby serpentine belt. In Australia both families are fairly well developed, but with very few exceptions the species are all rain-forest mesophytic types.

A striking similarity of New Caledonia with eastern Australia is the great development of Casuarina in the flora—14 species in New Caledonia and 12 in eastern Australia. In both countries the trees are very distinctive features in the landscape, and one species (*Casuarina Cunninghamiana* Miq.) is a common tree along streams and rivers in both countries.

The general facies of the vegetation strongly reminds one of that of parts of coastal North Queensland. An outstanding difference, however, is the absence of Eucalyptus in the New Caledonian flora. The place of the Eucalypt, as an outstanding tree of the savannah forest, is taken by the tree known universally in New Caledonia as the Niaouli (*Melaleuca viridiflora* Gaertn.). This tree is very abundant in coastal Queensland and New South Wales, being known as the Paper-barked or Broad-leaved Tea Tree, and where its presence gives to large tracts of country the name of Tea Tree Swamps. In New Caledonia the tree shows great adaptability to different conditions, accommodating itself, on the one hand, to dry hillsides, and on the other, to saline swamps along the margins and near the mouths of rivers.

A fairly common member of the Niaouli formation is *Acacia spirorbis* Labill. a phyllodineous species; like its congeners in Australia the trees are often attacked by a rust fungus (Uromycladium sp.) which forms large brown galls on the branches.

The Niaouli forest alternates with rich rain forest in much the same way as, in tropical and subtropical Australia, the Eucalyptus savannah alternates with heavy rain forest, the line of demarcation between the two being very sharp and in nowise gradual.

The Niaouli country is largely used as grazing land, when cleared it often becomes overrun with Lantana (*Lantana Camara* L.) and Guava (*Psidium Guajava* L.). These two plants also often overrun much of the pasture and farm lands in coastal Queensland.

This is not the place to enter in a general account of the vegetation of New Caledonia, as that has already been done by Schlechter[1] and by

[1] Die Vegetationsformationen von Neu-Caledonien, Bot. Jahrb. XXXIII. Beibl. LXXIII. 67–74 (1903).—Pflanzengeographische Gliederung der Insel Neu-Caledonien. (Bot. Jahrb. XXXVI. 1–41 (1905).

Guillaumin,[1] but some of the more outstanding features might be mentioned. These are, firstly, the extraordinary large number of woody plants compared with herbaceous ones, the proportion being about 5 to 1; secondly, the very large number of endemic species, the degree of endemism, according to Guillaumin,[2] reaching 76.5% of the flora; and thirdly, the large number of endemic conifers and taxads in the island estimated by Compton[2] at 31 well marked species, "an altogether exceptional number for so small an area as New Caledonia."

Some of the Conifers are being rapidly exploited as sources of commercial timber; particularly is this the case with the largest of the three New Caledonian species of Kauri (*Agathis lanceolata* Pancher) and the Sapin de Montagne (*Araucaria Balansae* Brong. & Gris). Both of these trees are being cut at a rapid rate and a big export trade being worked up, so that, in the absence of any policy of conservation, it is only a matter of a short time before most of the trees of a marketable size of the two species will be cut out.

In addition to the pines, the principal other timber cut is the Chêne Gomme (*Spermolepis gummifera* Brong. & Gris) a hardwood that is not exported but is used locally for building purposes at Noumea and other towns and settlements.

As facilities at Brisbane did not allow me to undertake the identification of the material collected, a set of the Angiosperms was sent to Dr. A. Guillaumin of Paris, and to him my best thanks are due for his promptness in dealing with the collections and returning determinations. To Prof. R. H. Compton I owe thanks for much valuable advice as to localities to visit in the very short time at my disposal and the quickest methods of getting there. From M. I. Franc I received much valuable assistance and advice. To Mr. E. D. Griffiths, and to MM. Varin and Huet I was indebted for facilities to visit large timber areas being worked under their control.

GYMNOSPERMAE[3]

Enumerated by ERNEST H. WILSON

CYCADACEAE

Cycas Linn.

Cycas neo-caledonica Linden in Ill. Hort. XXVIII. 32 (1881), name only.—Warburg in Monsunia, I. 180 (1900).—Safford in Bailey, Stand. Cycl. Hort. II. 933 (1914).

Cycas circinalis Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 270 (1911). —Not Linnaeus.

[1] "Essai de géographie botanique de la Nouvelle Calédonie" in F. Sarasin and J. Roux, Nova Caledonia, Bot. I. 256–293, map (1921).

[2] Jour. Linn. Soc. XLV. 421 (1922).

[3] Including specimens collected by I. Franc and complete references to all the species and varieties known from the island.

Cycas revoluta Guillaumin, l.c.—Not Thunberg.
Cycas sp. Compton in Jour. Linn. Soc. XLV. 424 (1922).

I have seen no material of any Cycad from New Caledonia, but, since the vegetation in general is so largely endemic, there is no reason why Cycas should be any exception; I therefore favor referring the Cycas material to Linden's species although he gave it merely a name; the only description there is, is a brief one by Safford. *Cycas revoluta* Thunb. is now known to be endemic on the islands of the Liukiu Archipelago. *C. circinalis* Linn. is native of the Malabar coast of the Indian peninsula but just how widely it is distributed is unknown. I doubt, however, if the plants from Madagascar or the Malay Archipelago, which have been referred to it, really belong there. R. H. Compton (l.c.) favors *C. Rumphii* Miq. which is much more likely since this species is widely spread on the islands of Java, Borneo, the Philippines and elsewhere in Malaysia, yet the flora of New Caledonia is not closely related to the above regions. So until good and sufficient material of the New Caledonian Cycads is available it may well be regarded as an endemic species and kept under Linden's name.

TAXACEAE

Subfam. I. PODOCARPEAE Reichb.[1]

Podocarpus L'Herit.

Sect. I. DACRYCARPUS Endl.

Podocarpus Vieillardii Parlatore in De Candolle, Prodr. XVI. pt. II. 521 (1868).—Brongniart & Gris in Bull. Soc. Bot. France, XVI. 325 (1869); in Ann. Sci. Nat. Paris, sér. 5, XIII. 341 (1871).—Pilger in Engler, Pflanzenr. IV.–5, 56, fig. 7 F (Taxac.) (1903).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 269 (1911); in Bull. Mus. Hist. Nat. Paris, XIX. 524 (1913).—Compton in Jour. Linn. Soc. XLV. 425 (1922).—Dallimore & Jackson, Handb. Conif. 58 (1923).

Podocarpus tenuifolia Parlatore in De Candolle, Prodr. XVI. pt. II. 521 (1868).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 269 (1911).
Dacrydium elatum compactum Carrière, Traité Conif. ed. 2, 693 (1869).
Dacrydium elatum tenuifolium Carrière, l. c.

Near Dombea, nos. 2112, 2285, October; tree about 13 m. tall, with spreading top, overhanging watercourses; not common.

Sect. II. MICROCARPUS Pilger

Podocarpus usta Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 243 (1866); in Bull. Soc. Bot. France, XIII. 426 (1866).—Parlatore in De Candolle, Prodr. XVI. pt. II. 520 (1868).—Pilger in Engler, Pflanzenr. IV.–5, 58, fig. 8 (Taxac.) (1903).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX, 269 (1911); in Bull. Mus. Hist. Nat. Paris, XVIII. 100 (1912).—

[1] Polypodiopsis Muelleri Carrière, Traité, Conif. éd. 2, 710 (1867).—Bertrand in Ann. Sci. Nat. Hist. Paris, sér. 5, XX, 65, in a note (5) (1874).—Pilger in Bot. Jahrb. LIV. 37 (1916); in Engler & Prantl, Nat. Pflanzenfam. ed. 2, XIII. 245 (1926).—Hutchinson in Kew Bull. Misc. Inform. 1920, 372.
This obscure plant has been usually referred to the Podocarpeae, but Hutchinson, acting on a suggestion from Professor Lecomte, identifies it with *Bauprea Balansae* Brong. & Gris, a member of the Proteaceae.

Compton in Jour. Linn. Soc. XLV. 425 (1922).—Dallimore & Jackson, Handb. Conif. 58 (1923).

Dacrydium ustum Vieillard in Ann. Sci. Nat. Hist. Paris, sér. 4, XVI. 56 (1861). —Carrière, Traité Conif. ed. 2, 697 (1867).

Sect. III. NAGEIA Endl.

Podocarpus minor Parlatore in De Candolle, Prodr. XVI. pt. II. 509 (1868).—Brongniart & Gris in Bull. Soc. Bot. France, XVI. 326 (1869); in Ann. Sci. Nat. Hist. Paris, sér. 5, XIII. 342 (1871).—Sebert, Not. Bois Nouv. Caléd. 170 (1874).—Pilger in Engler, Pflanzenr. IV. 5, 62 (Taxac.) (1903); in Bot. Jahrb. LIV. 36 (1916).—Schlechter in Bot. Jahrb. XXXIX. 16 (1907).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 269 (1911); in Bull. Mus. Hist. Nat. Paris, XIX. 383 (1913); XXVIII. 108 (1922).—Compton in Jour. Linn. Soc. XLV 425 (1922).—Dallimore & Jackson, Handb. Conif. 51 (1923).

Nageia minor Carrière, Traité Conif. ed. 2, 611 (1867).

Mt. Mou, alt. 1150 m., no. 2033, October; tree 13 m. tall with trunk 0.45 m. in diameter; bark dark gray. Rivière des Pirogues, no. 2261, October; shrub or small tree from 1.5 to 6 m. tall. Bay of Prony, Plaine des Lacs, *I. Franc*, no. 207 (ser. A), January, 1914.

Sect. IV. STACHYCARPUS Endl.

Podocarpus ferruginoides Compton in Jour. Linn. Soc. XLV. 424 (1922).—Dallimore & Jackson, Handb. Conif. 45 (1923).

I have seen no material of this species. It would appear that the New Caledonian specimen collected by *M. T. Leeard* and referred to *P. ferrugineus* D. Don by Pilger (in Engler, Pflanzenr. IV.–5, 67 [Taxac.] [1903]) belongs to Compton's species or to the undetermined species represented by C. T. White's no. 2120 enumerated below.

Podocarpus sp.

Baie des Pirogues, no. 2120, October 16; tree 40 ft. tall, rare, inland rain forest valleys.

The material consists of one seedling plant and two leafy branches, and, of the New Caledonian species is most closely related to *P. ferruginoides* Compton. The leaves are green on both surfaces, lanceolate, from 1 to 2 cm. long and 0.3 to 0.5 cm. broad, acute, rounded or truncate at the base with the petiole clasping the stem; they are arranged in one plane and the branches have a frondose appearance. From the description and figure of *P. vitiensis* Seem. this New Caledonian plant would appear to be very similar to the Fijian species.

Sect. V. EUPODOCARPUS Endl.

Podocarpus novae-caledoniae Vieillard in Ann. Sci. Nat. Hist. Paris, sér. 4, XVI. 56 (1861).—Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 242 (1866); in Bull. Soc. Bot. France, XIII. 425 (1866).—Parlatore in De Candolle, Prodr. XVI. pt. II. 513 (1868).—Pilger in Engler, Pflanzenr. IV.–5, 76 (Taxac.) (1903).—Guillaumin in Ann. Mus. Col. Marseille,

sér. 2, IX. 269 (1911); in Bull. Mus. Hist. Nat. Paris, XVIII. 100 (1912); XIX. 523 (1913); XXV. 373 (1919); XXVIII. 108 (1922).—Compton in Jour. Linn. Soc. LXV. 425 (1922).—Dallimore & Jackson, Handb. Conif. 53 (1923).

Podocarpus rivularis Pancher apud Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 243 (1866).

Rivière des Pirogues, no. 2231, October 25; shrub 1–3 m. tall, fairly common. Bay of Prony, side of streams, *I. Franc*, no. 96 (ser. A), July, 1913.

Podocarpus novae-caledoniae var. **latifolia** Brongniart apud Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 269 (1911).

Podocarpus gnidioides Carrière, Traité Conif. ed. 2, 656 (1867).—Pilger in Engler, Pflanzenr. IV.–5, 82 (Taxac.) (1903); in Bot. Jahrb. LIV. 39 (1916).—Schlechter in Bot. Jahrb. XXXIX. 16 (1907).—Guillaumin in Bull. Mus. Hist. Nat. Paris, XVIII. 100 (1912).—Dallimore & Jackson, Handb. Conif. 46 (1923).

Podocarpus alpina var. *arborescens* Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 242 (1866); in Bull. Soc. Bot. France, XIII. 425 (1866).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 269 (1911).

Podocarpus gnidioides var. **caespitosus** Carrière, Traité, Conif. éd. 2, 657 (1867).—Pilger in Engler, Pflanzenr. IV.–5, 84 (Taxac.) (1903).—Guillaumin in Bull. Mus. Hist. Nat. Paris, XVIII. 100 (1912).—Compton in Jour. Linn. Soc. XLV. 426 (1922).—Dallimore & Jackson, Handb. Conif. 46 (1923).

Podocarpus alpina var. γ. *caespitosa* Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 242 (1866); in Bull. Soc. Bot. France, XIII. 435 (1866).

Podocarpus caespitosus Pancher apud Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 242 (1866), as a synonym.

Podocarpus gnidioides Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 269 (1911).—Not Carrière.

Podocarpus longefoliolatus Pilger in Engler, Pflanzenr. IV.–5, 79(Taxac.) (1903).—Guillaumin in Bull. Mus. Hist. Nat. Paris, XVIII. 100 (1912).—Compton in Jour. Linn. Soc. XLV. 426 (1922).

Podocarpus sp.

Baie des Pirogues, no. 2118, October; tree about 50 ft. high, not common, inland rain forest valleys. Mt. Mou, on summit, alt. 1160 m., no. 2037[a], October; tree about 50 ft. tall with trunk 6 ft. in girth, with light gray longitudinally furrowed bark, growing associated with *Araucaria Rulei* F. Muell.

This is a typical Eupodocarp, but unfortunately only leafy branches are present. These strongly resemble *P. neriifolia* D. Don in general appearance. The leaves are up to 16 cm. in length and from 1 to 1.5 cm. broad, obtuse and mucronulate or subacute with a distinct petiole and midrib prominent on both surfaces. It would appear to be the same as *R. H. Compton's* no. 1273 collected in Mt. Canala (see Jour. Linn. Soc. XLV. 426 [1922].

Another undetermined species belonging to the Sect. Eupodocarpus is

Podocarpus sp. no. 271, *R. H. Compton* (in Jour. Linn. Soc. XLV. 426 [1922]).

Dacrydium Soland

Dacrydium taxoides Brongniart & Gris in Ann. Sci. Nat. Paris, sér. 5, VI. 245 (1866); in Bull. Soc. Bot. France, XIII. 427 (1866); in Nouv. Arch. Mus. Paris, IV. 7, t. 3 (1868).—Parlatore in De Candolle, Prodr. XVI. pt. II. 492 (1868).—Pilger in Engler, Pflanzenr. IV.–5, 45 (Taxac.) (1903).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 270 (1911).—Compton in Jour. Linn. Soc. XLV. 427 (1922).—Dallimore & Jackson, Handb. Conif. 31 (1923).

Podocarpus taxodioides Carrière, Traité Conif. éd. 2, 657 (1867).

Dacrydium araucarioides Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, VI. 244 (1866); in Bull. Soc. Bot. France, XIII. (1866); in Nouv. Arch. Mus. Paris, IV. 5, t. 2 (1868).—Parlatore in De Candolle Prodr. XVI. pt. II. 496 (1868).—Pilger in Engler, Pflanzenr. IV.–5, 48, fig. 5 F (Taxac.) (1903); in Bot. Jahrb. LIV. 36 (1916).—Schlechter in Bot. Jahrb. XXXIX. 15 (1907).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 270 (1911); in Bull. Mus. Hist. Nat. Paris, XXVIII. 108 (1922).—Schinz & Guillaumin in Sarasin & Roux, Nov. Caled. Bot. I. 114 (1920).—Compton in Jour. Linn. Soc. XLV. 427 (1922).—Dallimore & Jackson, Handb. Conif. 26 (1923).

Dacrydium arthrotaxoides Carrière, Traité Conif. éd. 2, 697 (1867).

Podocarpus araucarioides Brongniart & Gris apud Pancher in Sebert, Not. Bois N. Caléd. 171 (1874).

Rivière des Pirogues, no. **2122,** October 16; small tree 6 m. tall, with spreading candelabrum-form crown; abundant on dry hills of serpentine rock. Bay of Prony, Plaine des Lacs, *I. Franc*, no. 764 (series A), September, 1913.

Dacrydium Balansae Brongniart & Gris in Bull. Soc. Bot. France, XVI. 328 (1869); in Ann. Sci. Nat. Paris, sér. 5, XIII. 344 (1871).—Pilger in Engler, Pflanzenr. IV.—5, 53 fig. 5 D (Taxac.) (1903).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 270 (1911).—Schinz & Guillaumin in Sarasin & Roux, Nov. Caled. Bot. I. 115, fig. (1920).—Compton in Jour. Linn. Soc. XLV. 427 (1922).—Dallimore & Jackson, Handb. Conif. 26 (1923).

Dacrydium lycopodioides Brongniart & Gris in Bull. Soc. Bot. France, XVI. 329 (1869); in Ann. Sci. Nat. Hist. Paris, sér. 5, XIII. 345 (1871).—Pilger in Engler, Pflanzenr. IV.—5, 52 (Taxac.) (1903).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 270 (1911).—Compton in Jour. Linn. Soc. XLV. 427 (1922).—Dallimore & Jackson, Handb. Conif. 31 (1923).

Mont Mou, no. **2001,** October; tree 13 m. tall, girth 2 m., with spreading crown and dark gray bark. Rivière des Pirogues, no. **2238,** October 25, 1923; tree 16 m. tall, girth 2 m.

Acmopyle Pilger

Acmopyle Pancheri Pilger in Engler, Pflanzenr. IV.–5, 117 fig. 24 (1903); in Bot. Jahrb. LIV. 43 (1916).—Guillaumin in Bull. Mus. Hist.

Nat. Paris, xxv. 373 (1919).—Compton in Jour. Linn. Soc. xlv. 426 (1922).—Dallimore & Jackson, Handb. Conif. 19 (1923).

Dacrydium Pancheri Brongniart & Gris in Bull. Soc. Bot. France, xvi. 330 (1869); in Ann. Sci. Nat. Hist. Paris, sér. 5, xiii. 346 (1871).

Podocarpus pectinata Pancher apud Brongniart & Gris in Bull. Soc. Bot. France, xvi. 330 (1869).—Masters in Gard. Chron. sér. 3, xi. 113 (1892).—Kew Bull. Misc. Inform. 1892, 105.—Hooker f. in Bot. Mag. cxxviii. t. 7854 (1902).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 269 (1911).

Mont Mou, alt. 1200 m., *I. Franc*, no. 170, January 3, 1917.

Subfam. II. Taxeae Reichb.

Austrotaxus Compton

Austrotaxus spicata Compton in Jour. Linn. Soc. lxv. 427, t. 26 (1922).—Dallimore & Jackson, Handb. Conif. 20 (1923).

Mt. Canala, *R. H. Compton;* fragment of type.

PINACEAE

Subfam. I. Araucarieae Reichb.

Agathis Salisb.

Agathis ovata Warburg in Monsunia, i. 186 (1900).—Schlechter in Bot. Jahrb. xxxix. 16 (1907).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 267 (1911); in Bull. Mus. Nat. Hist. Paris, xviii. 100 (1912); xxviii. 108 (1922).—Compton in Jour. Linn. Soc. xlv. 431 (1922).—Dallimore & Jackson, Handb. Conif. 146 (1923).

Dammara ovata Moore apud Gordon, Pinet. Suppl. 28 (1862).—Parlatore in De Candolle, Prodr. xvi. pt. ii. 375 (1868).

Dombea, mountains about 1000 m. altitude, no. **2284,** October; tree about 30 ft. high with spreading crown, bark persistent, rather rough unlike that of other species of Agathis. Baie des Pirogues, inland toward Plaine des Lacs, on serpentine rocks, no. **2109,** October 16; tree 20 ft. tall, only one seen. Rivière des Pirogues, no. **2272,** October; tree about 40 ft. tall with dense spreading crown and trunk 4½ ft. in girth; only one tree seen in a journey of 16 miles. Bay of Prony, *I. Franc*, no. 156 (ser. A), October, 1913.

Agathis lanceolata Warburg in Monsunia, i. 186 (1900).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 267 (1911).—Compton in Jour. Linn. Soc. xlv. 431 (1922).—Dallimore & Jackson, Handb. Conif. 144 (1923).

Dammara lanceolata Pancher in Sebert, Not. Bois Nouv. Caléd. 169 (1874)

Mont Mou, in rain forest at base, no. **2064,** October 5; tree 100 ft. tall, girth 9 ft., bark scaling off in thick flakes of irregular size. Baie des Pirogues, inland in rich forest valleys, no. **2116,** October.

Mr. White states that this is the most important soft-wood tree in New Caledonia.

Agathis Moorei Masters in Jour. Hort. Soc. Lond. xiv. 197 (1892).—Warburg in Monsunia, i. 186 (1900).—Seward & Ford in Trans. Roy. Soc. Lond. cxcviii. 315, figs. 1, a; 4, c–d; 24, a–d (1906).—Guillaumin in Ann.

Mus. Col. Marseille, sér. 2, IX. 267 (1911).—Compton in Jour. Linn. Soc. XLV. 431 (1922).—Dallimore & Jackson, Handb. Conif. 146 (1923).

Dammara Moorei Lindley in Jour. Hort. Soc. Lond. VI. 271 (1851). Carrière, Traité Conif. 429 (1855). Gordon, Pinet. 78 (1858). Vieillard in Ann. Sci. Nat. Paris, sér. 4, XVI. 56 (1861). Henkel & Hochstetter, Syn. Nadelh. 216 (1865). Parlatore in De Candolle, Prodr. XVI. pt. II. 376 (1868).

Agathis spinulosa Warburg in Monsunia, I. 186 (1900).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).

Dammara spinulosa C. Moore in Cat. Pl. Gov. Bot. Gard. Sydney, 1895, 89.

This is an obscure plant, and so, too, is that named *Dammara pumila* C. Moore (in Cat. Pl. Gov. Bot. Gard. Sydney, 1895, 89). Both are probably referable to one or other of the foregoing species of New Caledonian Agathis.

Agathis hypoleuca Warburg in Monsunia, I. 186 (1900).—Seward & Ford in Trans. Roy. Soc. Lond. CXCVIII. 316 (1906).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 267 (1911).

Dammara hypoleuca Moore apud Henkel & Hochstetter, Syn. Nadelh. 217 (1865).

A sixth species of Agathis from New Caledonia is listed by Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 267 (1911) citing localities and collectors under the name of *A.* (*D. macrophylla* Lindl.). This is probably referable to one or other of the five species enumerated above. It is not the *Dammara macrophylla* Lindl. (in Jour. Hort. Soc. Lond. VI. 271 [1851]) which is a native of the Queen Charlotte Islands where it was collected on the Island of Vanicoro by C. Moore in 1850.

Araucaria Juss.

Sect. I. Columbea Endl.

Araucaria Rulei F. Mueller apud Lindley in Gard. Chron. 1861, 868, in part, exclud. figs.—Gordon, Pinet. suppl. 15 (1862).—Henkel & Hochstetter, Syn. Nadelh. 7 (1865).—Jackson in Intellectual Obser. VII. 428 (1865).—Parlatore in De Candolle, Prodr. XVI. pt. II. 371 (1868).—Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, XIII. 360 (1871); in Nouv. Arch. Mus. Paris, VII. 216, t. 16, figs. 4–7 (1871); in Bull. Soc. Bot. France, XVIII. 137 (1871).—Pancher in Sebert, Not. Bois Nouv. Caléd. 168 (1874).—C. Raffill in Gard. Chron. sér. 3, XL. 353 (1906).—Seward & Ford, in Trans. Roy. Soc. Lond. CXCVIII. 328, figs. 13, a; 20, b-d, f-h; 22; 25, a-c; 26, a (1906).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).—Bailey, Stand. Cycl. Hort. I. 346, fig. 304 (1914).—Schinz & Guillaumin in Sarasin & Roux, Nov. Caled. I. 114, t. 5, fig. 2 (1920).—Maiden in N. S. Wales Bot. Gard. Gov. Domains Rep. 1920, t. 7 (1922).—Compton in Jour. Linn. Soc. XLV. 429 (1922).—Kotze in Union S. Afr. For. Dept. Bull. no. VI. 11, 18, t. 11, fig. 1 (1923).—Dallimore & Jackson, Handb. Conif. 160 (1923).

Araucaria intermedia Vieillard in Ann. Sci. Nat. Hist. Paris, sér. 4, XVI. 54 (1861).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).

Eutacta Rulei Verlot in Rev. Hort. 1866, 279, fig. 1.—Carrière in Rev. Hort. 1866, 392, fig. 2.

Eutacta Rulei polymorpha Carrière in Rev. Hort. 1866, 350, fig. 41; Traité Conif. ed. 2, 606 (1867).
Eutacta Pancherii Carrière, Traité Conif. éd. 2, 615 (1867).
Eutacta Rulei compacta Carrière in Rev. Hort. 1866, 392, fig. 1; Traité Conif. éd. 2, 606 (1867).
Eutacta Muelleri microphylla Carrière in Rev. Hort. 1866, 392, fig. 4; Traité Conif. éd. 2, 607 (1867).
Araucaria Rulei β. *patens* Barsali in Atti Soc. Tosc. Sci. Nat. xxv. 162 (1909).—Fedde, Rep. Spec. Nov. ix. 140 (1911).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 268 (1911).
Araucaria Rulei var. *polymorpha* Bailey Stand. Cycl. Hort. i. 346 (1914).
Araucaria Rulei var. *compacta* Bailey, l. c.

Mt. Mou, alt. 1150 m., no. 2021, October; the principal tree in rich rain forest on the summit of the mountain.

Araucaria Rulei var. **Goldieana** Masters in Jour. Hort. Soc. Lond. XIV. 198 (1892).—Bailey, Stand. Cycl. Hort. i. 346 (1914).—Rehder in Bailey, Cult. Evergreens, 244 (1923).

Araucaria Van Geertii Hort. apud van Geert in Gard. Chron. n. s. v. 603 (1876), name only.
Araucaria Goldieana Hort. apud T. Moore in Flor. & Pomol. 1877, 39, fig. Nicholson, Dict. Gard. i. 106 (1887).
Araucaria excelsa Goldieana C. Raffill in Gard. Chron. sér. 3, xl. 353, fig. 140 (1906).

Araucaria Rulei var. **pendula** Barsali in Atti Soc. Tosc. Sci. Nat. xxv. 162 (1909).—Fedde, Rep. Spec. Nov. ix. 140 (1911).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 268 (1911).

Araucaria Muelleri Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, xiii. 362 (1871); in Nouv. Arch. Mus. Paris, vii. 219, tt. 15, 16, figs. 1–3 (1871); in Bull. Soc. Bot. France, xviii. 139 (1871).—Rodigas in Illust. Hort. xxix. 449, t. 73 (1882).—Seward & Ford in Trans. Roy. Soc. Lond. cxcviii. 329, fig. 11, d–e (1906).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 268 (1911).—Compton in Jour. Linn. Soc. xlv. 430 (1922).—Dallimore & Jackson, Handb. Conif. 160 (1923).

Araucaria Rulei Lindley in Gard. Chron. 1861, 868, figs., in part.
Eutacta Muelleri Carrière in Rev. Hort. 1866, 392, fig. 3; Traité Conif. éd. 2, 607 (1867).
Araucaria Rulei grandifolia Mueller apud Carrière in Rev. Hort. 1866, 39, as a synonym.

Araucaria montana Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, xiii. 358 (1871); in Nouv. Arch. Mus. Paris, vii. 215, t. 14, figs. 1–3 (1871); in Bull. Soc. Bot. France, xviii. 136 (1871).—Seward & Ford in Trans. Roy. Soc. Lond. cxcviii. 330, fig. 11, f (1906).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, ix. 268 (1911).—Compton in Jour. Linn. Soc. xlv. 429 (1922).

Sect. II. Eutacta Parl.

Araucaria columnaris Hooker in Bot. Mag. lxxviii. t. 4635 (1852).—Van Houtte in Fl. des Serr. vii. 243, tt. 733–34 (1852).—Jackson in Intellectual Obser. vii. 417 (1865).—Schinz & Guillaumin in Sarasin & Roux, Nov. Caled. i. 113, t. 5, fig. 1 (1920).—Guillaumin in Bull. Mus. Nat. Hist. Paris, xxviii. 108 (1922).

Cupressus columnaris Forster, Florul. Ins. Austr. Prodr. 67 (1786), excluding the Norfolk Island plant.

Araucaria excelsa Lambert, Descr. Gen. Pin. ed. 2, 81, t. 47 fig. a (1828), as to the New Caledonian plant.—Not R. Brown.

Araucaria Cookii R. Brown apud D. Don in Trans. Linn. Soc. XVIII. 164 (1839).—Endlicher, Syn. Conif. 188 (1847).—Lindley in Jour. Hort. Soc. Lond. VI. 272, 267, fig. d (1851).—Paxton, Flow. Gard. II. 132 (1851–52); III. 77, fig, (1852–53).—Lemaire in Jard. Fleur. II. misc. 72, fig. (1852).—Carrière, Traité Conif. 421 (1855).—Gordon, Pinet. 27 (1858).—Vieillard in Ann. Sci. Nat. Paris, sér. 4, XVI. 55 (1861).—Henkel & Hochstetter, Syn. Nadelh. 12 (1865).—Parlatore in De Candolle, Prodr. XVI. pt. II, 373 (1868).—Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, XIII. 352 (1871); in Nouv. Arch. Mus. Paris, VII. 208, t. 14, figs. 4–6 (1871); in Bull Soc. Bot. France, XVIII. 131 (1871).—Pancher in Sebert, Not. Bois Nouv. Caléd. 166 (1874).—R. Abbay in Gard. Chron. n. s. VII. 86, figs. 13, 14 (1877).—Veitch, Man. Conif. 195 (1881).—Gard. Chron. sér. 3, III. 774, figs. 104, 106 (1888); XXX. 387, figs. 116, 117 (1901).—Seward & Ford in Trans. Roy. Soc. Lond. CXCVIII. 326, figs. 11, a-c, 12, 15, 24, g (1906).—C. Raffill in Gard. Chron. ser. 3, XL. 352, fig. 139 (1906).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).—Bailey, Stand. Cycl. Hort. I. 346 (1914).—Maiden, N. S. Wales Bot. Gard. Gov. Domains Rep. 1920, t. 7 (1922).—Compton in Jour. Linn. Soc. XLV. 429 (1922).—Kotze in Union S. Afr. For. Dept. Bull. no. VI. 13, 20, tt. 9, 10, 11, fig. 2 (1923).—Rehder in Bailey, Cult. Evergreens, 244 (1923).—Dallimore & Jackson, Handb. Conif. 154 (1923).

Araucaria subulata Vieillard in Ann. Sci. Nat. Hist. Paris, sér. 4, XVI. 55 (1861).—Seward & Ford in Trans. Roy. Soc. Lond. CXCVIII. 330 (1906).

Eutacta Cookii Carrière, Traité Conif. ed. 2, 612 (1867).

Araucaria Cookii gracilis Carrière, l. c. 613.

Eutacta Cookii ovalifolia Carrière, l. c.

Eutacta Cookii viridis Carrière, l. c.

Eutacta subulata Carrière, l. c. 614.

Eutacta minor Carrière, l. c.

Eutacta humilis Carrière, l. c. 616.

Araucaria Cookii var. *Raoulei* C. Moore in Cat. Pl. Bot. Gard. Sydney, 88 (1895).

Araucaria Cookii var. *rigida* C. Moore, l. c.

Araucaria Raouli Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).

Baie des Pirogues, no. 2205, October; trees up to 100 ft. high, forming small colonies on the coast and ascending gullies among scrub between the hills of serpentine rock.

Bay of Prony, *I. Franc*, no. 1604 (ser. A). Noumea, cultivated, no. 2290, November 4. Noumea, Hort. *I. Franc*, no. 2129, October. Dombea, Hort. *M. Huet*, no. 2166, October.

Araucaria columnaris f. **luxurians** Wilson, comb. nov.

Araucaria Cookii var. *luxurians* Brongniart & Gris in Ann. Sci. Nat. Paris, sér. 5, XIII. 354 (1871).—Seward & Ford in Trans. Roy. Soc. Lond. CXCVIII. 327, fig. 11, a (1906).—Dallimore & Jackson, Handb. Conif. 154 (1923).

Araucaria columnaris f. **pendula** Wilson, comb. nov.

Araucaria Cookii var. *pendula* C. Moore in Cat. Pl. Bot. Gard. Sydney, 88 (1895), name only.

Araucaria Balansae Brongniart & Gris in Ann. Sci. Nat. Hist. Paris, sér. 5, XIII. 351 (1871); in Nouv. Arch. Mus. Paris, VII. 206, t. 13 (1871); in Bull. Soc. Bot. France, XVIII. 130 (1871).—André in Illust. Hort. XXII. 26, t. 197, fig. (1875).—C. Raffill in Gard. Chron. ser. 3, XL. 352 (1906).—Seward & Ford in Trans. Roy. Soc. Lond. CXCVIII. 329, fig. 20, i (1906).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).—Bailey,

Stand. Cycl. Hort. I. 346 (1914).—Compton in Jour. Linn. Soc. XLV. 429 (1922).—Rehder in Bailey, Cult. Evergreens, 244 (1923).—Dallimore & Jackson, Handb. Conif. 151 (1923).

Araucaria Rulei var. *elegans* Veitch, Man. Conif. 197 (1881).—Nicholson, Dict. Gard. I. 106 (1887).

Araucaria elegans C. Moore in Cat. Pl. Bot. Gard. Sydney, 88 (1895).—Bailey, Stand. Cycl. Hort. I. 346 (1914).

Baie des Pirogues inland, no. **2121**, October 16; tree over 100 ft. tall, trunk 4 ft. diam. in rain forest valleys.

Mr. White observes that this furnishes splendid soft-wood timber and is much exploited at the present time, ranking next to *Agathis lanceolata* Warb. as the most important soft-wood tree in New Caledonia.

Callitris sulcata Schlechter in Bot. Jahrb. XXXIX. 16 (1907).—Compton in Jour. Linn. Soc. XLV. 431 (1922).

Frenela sulcata Parlatore in Enum. Sem. Hort. Bot. Florence, 1862, 23; in De Candolle, Prodr. XVI. pt. II. 446 (1868).

Frenela subumbellata Parlatore in De Candolle, Prodr. XVI. pt. II. 447 (1868).

Frenela Balansae Brongniart & Gris in Ann. Sci. Nat. Paris, sér. 5, XIII. 348 (1871).

Callitris Balansae Schlechter in Bot. Jahrb. XXXIX. 16 (1907).—Guillaumin in Ann. Mus. Col. Marseille, sér. 2, IX. 268 (1911).

Callitris sulcata var. **alpina** Compton in Jour. Linn. Soc. XLV. 432 (1922).

Callitropsis Compton

Callitropsis araucarioides Compton in Jour. Linn. Soc. XLV. 432 t. 27 (1922).

Bay of Prony, *I. Franc.*

Libocedrus Endl.

Libocedrus austrocaledonicus Brongniart & Gris in Ann. Sci. Nat. Paris, sér. 5, XIII. 349 (1871); in Bull. Soc. Bot. France, XVIII. 140 (1871).—Guillaumin in Ann. Mus. Col. Marseilles, sér. 2, IX. 269 (1911).—Compton in Jour. Linn. Soc. XLV. 434 (1922).—Dallimore & Jackson, Handb. Conif. 301 (1923).

Libocedrus neocaledonicus Schlechter in Bot. Jahrb. XXXIX. 16 (1907).

ANGIOSPERMAE

Determined by A. GUILLAUMIN Dr. ès Sc.
Muséum d'histoire naturelle, Paris

GRAMINEAE

Greslania circinata Bal.

Inland from Baie des Pirogues, in rather dry stunted forest associated with Melaleuca, Hibbertia, etc., no. **2119**; bamboo 3 m. tall.

LILIACEAE

Cordyline neo-caledonica Linden (*Dracaena neo-caledonica* Hort.; *Cordyline cannaefolia* Schltr.).

Baie des Pirogues, no. **2183**; shrub mostly about 1–1.25 m.; flowers white, suffused or streaked with lavender.

FLAGELLARIACEAE

Flagellaria indica L.

Baie des Pirogues, no. 2199; climber, climbing over trees everywhere, very common along the river banks.

Joinvillea elegans Brong. & Gris (*Flagellaria elegans* Seem.; *F. plicata* Hook f.).

Rivière des Pirogues (also seen on Mont Mou), very abundant, no. 2257; a bamboo-like plant 4–5 m. high.

CASUARINACEAE

Casuarina Cunninghamiana Miq.

In rather dry forests, base of Mont Mou, very abundant, no. 2046; tree attaining more than 30 m., the trunk with a diam. of 60 cm., bark rather rough; local name "Bois de fer." Dombea, along watercourses, no. 2160; tree of 20 m.; flowers apparently dioecious. Baie des Pirogues, on serpentine hills, no. 2178; tree 7 m. or more. Rivière des Pirogues, along the river associated with *C. equisetifolia* var. *incana*, no. 2276; tree 13 m.

Casuarina Deplancheana Miq. var. **crassidens** J. Poiss.

Rivière des Pirogues, no. 2230; a conifer-like tree 20 m. or more; branches erect.

Casuarina equisetifolia Forst. var. **incana** J. Poiss.

Baie des Pirogues, along sandy sea and river shores ascending here and there to the tops of serpentine hills, no. 2203; tree about 7 m., with drooping branches.

Casuarina nodiflora Forst.

Rivière des Pirogues, no. 2240; tree 20 m. high or more, with a trunk diameter of 60 cm., branchlets drooping.

Casuarina Poissoniana Schltr. (*C. Deplancheana* Miq. var. *debilis* J. Poiss.)

In rather dry forests, base of Mont Mou, also stunted trees on exposed hillsides, no. 2047; tree 13 m. tall, with a spreading top; local name "Bois de fer de montagne."

CHLORANTHACEAE

Ascarina rubricaulis Solms.

Mont Mou, no. 2000; small tree 5 m.; branchlets dark red; leaves yellowish-green above, pale almost white beneath; fruits small red.

ULMACEAE

Trema Vieillardi Schltr. (*Sponia Vieillardi* Planch.; *Celtis orientalis* Jeanneny, nomen).

Edge of rain forests, base of Mont Mou, no. 2073; tree 7 m., with slender trunk and spreading top.

MORACEAE

Ficus austro-caledonica Bur. var. **subattenuata** Bur.

Rain forests, base of Mont Mou, no. 2039; small tree about 10 m.; receptacles (only seen green) rather tuberculate, 1.8 cm. diam. Rain forests, base of Mont Mou, no. 2063; tree 12 m.

Ficus edulis Bur. var. **cordata** Bur.

Rain forests, base of Mont Mou, no. **2097**; tree 12 m., spreading top, receptacles large, hairy, 4.5 cm. diam.

Ficus edulis Bur. var. **ovata** Bur.

Baie des Pirogues, in small coastal scrub, no. **2283**; tree 12 m., spreading top; receptacles large, red, axillary, 5 cm. diam.

Ficus philippinensis Miq.

Rain forests, base of Mont Mou, no. **2087**; tree.

Ficus stenocarpa F. Muell. (*F. proteus* Bur.).

Rain forests, base of Mont Mou, no. **2078**; tree of 7 m. (but probably growing much larger), does not run with a milky sap when cut; receptacle very dark purple, Dombea, no. **2152**. (This fig is common in the rain forests of coastal Queensland.—C.T.W.)

Ficus Webbiana Miq. var. **cordata** Bur.

Rain forests, base of Mont Mou, no. **2016**; slender tree 7 m.; receptacles white marked with small dark dots.

Sparattosyce dioica Bur.

Rivière des Pirogues, no. **2235**; tree 18 m. with a densely foliaged top; exuding milky sap when cut.

PROTEACEAE

Grevillea Gillivrayi Hook.

Baie des Pirogues, no. **2198**; slender tree, about 7 m., rather straggly growth; flowers white, usually tinged with pink; racemes not secund.

Grevillea heterochroma Brong. & Gris.

Mont Mou, mostly in open exposed scrubby situations, no. **2008**; in the open a dwarfed tree of spreading habit about 2.45 m. high, in more sheltered situations attaining 10 m.; flowers cream-colored, in secund racemes.

Grevillea macrostachys Brong. & Gris.

Baie des Pirogues, common everywhere on the serpentine hills, no. **2181**; tree of spreading habit, averaging about 5 m. but higher in more sheltered situations; flowers white.

Stenocarpus trinervis Guillaumin (*Lomatia trinervis* Montr.; *Stenocarpus laurinus* Brong. & Gris.; *S. laurifolius* Panch. & Seb.).

Rivière des Pirogues, no. **2269**; tree 13 m.

Stenocarpus umbellatus Schltr. (*S. Forsteri* R. Br.).

Inland from Baie des Pirogues, no. **2125**; tree 5 m.; flowers very pale yellow.

Knightia Deplanchei Vieill. ex Brong. & Gris.

Rivière des Pirogues no. **2265**; small tree 5 m.; spreading habit.

SANTALACEAE

Exocarpus neo-caledonicus Schltr. & Pilg.

Inland from Baie des Pirogues, no. **2105**, shrub 1.25 m.

Exocarpus phyllanthoides Endl. (*E. dilatatus* S. Moore).

Summit of Mont Mou, no. **2022**; shrub 1.75 m.; flowers small, yellow, in short spikes in axils of phylloclades.

LAURACEAE

Cryptocarya lanceolata Guillaumin (*Beilschmiedia lanceolata* Panch. & Seb.).

Rain forests, base of Mont Mou, no. 2172; tree 13 m., very spreading habit.

SAXIFRAGACEAE

Argophyllum montanum Schltr. (*A. Schlechterianum* Bonati & Petitm.).

Baie des Pirogues, common on the serpentine hills, no. 2185; shrub 1–1.5 m. high; leaves glossy above, dull and paler beneath; axes of panicle, pedicels and calyces covered with a close white tomentum; corolla yellow.

Dedea media Baill.

Mont Mou, on open exposed scrubby hills, no. 2010; shrub, flowers white, in axillary racemes.

Strasburgeria calliantha Baill.

Rain forests, summit of Mont Mou, no. 2026, coll. by *Garigou*; small tree 7 m. tall.

PITTOSPORACEAE

Pittosporum mouanum Guillaumin, n. sp.

Frutex 4 m. altus, ramis primum lanuginosis, deinde glabris, cortice cinereo desquamente; foliis sub-verticillatim approximatis, oblanceolatis (10–12 : 2.5 cm.), primum sparse lanuginosis, deinde glabris, interdum margine profunde et irregulariter incisis, apice acutis, basi in petiolum 1.5 cm. longum sensim attenuatis, costa supra impressa, subtus prominula, nervis immersis, fere inconspicuis; floribus rubro-brunneo-viridibus, in axillis foliorum nondum omnino evolutorum pendulis; pedicellis 2–3 mm. longis, fulvo-lanuginosis; sepalis 5.5 mm. longis, linearibus, concavis, fere glaberrimis; petalis 5, elliptico-linearibus (6 : 2 mm.), apice rotundatis, medio coherentibus, intus extraque glabris, tubi parte lineari 4 mm. longa, limbi 2 mm. longa; staminibus 10, petalorum 4/5 aequantibus, filamentis basim versus paululo dilatatis, quam antheras longioribus, antheris linearioblongis, apice apiculatis; ovario ellipsoideo, fulvo-tomentoso, stylo cylindrico antheras paululo superante, stigmate leviter dilatato.

Summit of Mont Mou, no. 2024 (shrub about 4 m.; leaves green above, paler beneath; flowers insignificant, greenish, suffused with reddish brown.

Very near to *P. xanthanthum* Schltr. but the pedicels are shorter and the petals and filaments much shorter (the flower, however, is not fully opened), the style is not subulate at the end, but is terminated by a slightly dilated stigma. Besides the leaves are irregularly incised, but as I have already indicated,[1] it seems that in a number of New Caledonian species the leaves may be sometimes quite entire and sometimes dentate or incised.

Pittosporum Simsonii Montr. (*P. turbinatum* Brong. & Gris).

Rain forests, base of Mont Mou, no. 2048; tree about 13 m. high, with white, sweetly scented flowers.

[1] In Bull. Mus. Hist. Nat. Paris, xxv. 214 (1919).

Pittosporum suberosum Panch. (*P. rhytidocarpum* Brong. & Gris, non A. Gray).

Noumea, in small coastal scrub, no. **2099**; small tree, 5–7 m.

CUNONIACEAE

Spiraeanthemum ellipticum Vieill. ex Pampan.

Summit of Mont Mou, no. **2031**; shrub 1.20 m. high.

Geissois hirsuta Brong. & Gris.

Dombea, no. **2158**; tree 13 m., with spreading top; flower red.

Geissois pruinosa Brong. & Gris.

Rivière des Pirogues, no. **2211**; slender tree about 7 m. high; flowers red, in racemes mostly on the older wood.

Geissois racemosa Labill.

Rain forest, base of Mont Mou, no. **2070**; tree 20 m.; leaves turning red when old.

Geissois spec. aff. *G. montana* Brong. & Gris.

Rain forest, base of Mont Mou, no. **2072**; small tree of 7 m., leaves turning red when old.

Cunonia macrophylla Brong. & Gris.

Mont Mou, on open exposed scrubby hillsides, no. **2015**; shrub 2 m. high; young shoots protected between a pair of large green or red stipules; leaves thick and coriaceous, rhachis and petiole usually red, young leaves red.

Cunonia montana Schltr.

Summit of Mont Mou, abundant, no. **2025**; shrub 1.50 m. high; young shoots red.

Cunonia purpurea Brong. & Gris.

Rivière des Pirogues; fairly abundant, no. **2224**; shrub 2–3 m. high or more; flowers red.

Pancheria alaternoides Brong. & Gris.

Mont Mou, in open scrubby country, no. **2006**; shrub 1.50 m.

Pancheria alaternoides Brong. & Gris var. **lanceolata** Pampan. (an potius *P. lanceolata* Vieill. ex Pampan?).

Baie des Pirogues, no. **2189**; shrub 2 m.

Pancheria elegans Brong. & Gris.

Rivière des Pirogues, no. **2113**; tree of 7 m., overhanging river-banks; leaves light green above, very pale green beneath; flowers white, in heads.

Pancheria Engleriana Schltr.

Mont Mou, about 1000 m. alt., no. **2030**; shrub 1.20 m.; flowers in dense globular heads, the heads white or cream-colored owing to the protruding stamens.

Pancheria ferruginea Brong. & Gris.

Mont Mou, on open dry hills, no. **2002**; shrub 1.20 m. high.

Pancheria hirsuta Vieill. ex Pampan. (*P. insignis* Schltr.).

Mont Mou, open exposed scrubby hillsides, no. **2011**; shrub 1.20–1.50 m. high; leaves revolute, lustrous green above, dull beneath.

Pancheria obovata Brong. & Gris.

Rivière des Pirogues, no. **2201**; shrub 1.50 m. high.

Pancheria Sebertii Guillaumin (*P. ternata* Panch. & Seb., non Brong. & Gris).

Rain forest, base of Mont Mou, no. **2092**; small tree.

LEGUMINOSAE

Acacia Farnesiana Willd.

Noumea, everywhere along road sides, no. **2287**; shrub 1–1.5 m. high.

Acacia spirorbis Labill. (*Albizzia auriculata* Fourn.).

Noumea, in small coastal scrub, no. **2133**; small tree about 5 m. tall, with a spreading top; in some cases very badly attacked by Uromyceladium (rust) galls. Baie des Pirogues, no. **2194**; small tree 7 m. tall or less, with spreading top and of irregular growth.

Serianthes calycina Benth. (*S. myriadenia* Panch. & Seb., non Planch. ex Benth.).

Dombea, no. **2041**; tree about 13 m. tall, with a light colored bark and spreading top.

Leucaena glauca Benth.

Noumea, no. **2144**; small tree of 4 m.; flowers white, in small heads.

Storckiella Pancheri Baill. (*S. laurina* Gdr.).

Rivière des Pirogues, abundant, no. **2277**; a handsome tree of 13 m.; flowers yellow.

Mezoneurum Baudouini Guillaumin.

Païta, no. **2173**; climbing to the tops of forest trees; flowers yellow.

LINACEAE

Hugonia Deplanchei Vieill. ex Guillaumin, nom. nov. (*Durandea Deplanchei* Stapf.).

Rivière des Pirogues, no. **2237**; small tree of 5 m., of straggling growth; flowers yellow.

RUTACEAE

Evodia drupacea Labill.

Rivière des Pirogues, no. **2233**; small tree about 10 m. tall.

Evodia pseudo-obtusifolia Guillaumin.

Rivière des Pirogues, no **2190**; small tree about 7 m. high; fruit with 4 fleshy 1-seeded pale yellow carpels.

Melicope lasioneura Baill. ex Guillaumin.

Rain forests, foot of Mont Mou, no. **2058**; a small very slender tree 7 m. tall.

Eriostemon pallidum Schltr.

Rivière des Pirogues, no. **2226**; dense growing spreading shrub of 1.50 m.; flowers white.

Myrtopsis novae-caledoniae Engl.

Baie des Pirogues, in small coastal gully scrub, no. **2207**; small tree 7 m. tall, of rather irregular growth.

Flindersia Fournieri Panch. & Seb.

Rain forest valleys, inland from Baie des Pirogues, no. **2125**; tree about 13 m. tall.

Acronychia laevis Forst. (*Huonia laevis* Montr., *Lawsonia Acronychia* Forst.)

Rain forests, base of Mont Mou, no. **2085**; small tree. Baie des Pirogues, in a small scrub near the coast, no. **2268**; small tree about 7 m. tall.

Murraya exotica DC. (*Limonia lucida* Forst.).

Noumea, in a small coastal scrub, no. **2136**; shrub about 3 m. high, of upright growth; flowers white.

SIMARUBACEAE

Soulamea fraxinifolia Brong. & Gris.

Païta, no. **2171**; small tree about 7 m. tall; flowers small, yellow. Dombea, no. **2164**; small tree of 7 m.

Soulamea Pancheri Brong. & Gris.

Unfortunately, the field label belonging to this specimen was lost, but so far as I remember it was a small tree collected at Païta.—C.T.W.

Soulamea tomentosa Brong. & Gris.

In small coastal scrub, Noumea, no. **2135**; small tree 7 m. tall, of spreading habit; flowers small, yellow.

BURSERACEAE

Canarium Whitei Guillaumin, n. sp.

Arbor mediocris, ramulis petiolisque primum rufo-tomentosis, foliis 7–8-jugis, interstitiis 3–4 cm. longis, foliolis rarius oppositis, longe petiolulatis (1.5–2.5 cm.), oblongis (8–13 : 4–4.5 cm.), basi obtusis, apice acuminatis, leviter coriaceis, nervis lateralibus 11–14, venis reticulatis in utraque pagina prominulis. Drupa obovoidea, compressa (4 : 3 : 2.5 cm.), endocarpio crassissimo, 2-loculari, uno loculo seminifero.

Rain forests, Rivière des Pirogues, no. **2255**; a medium sized tree.

Although the specimen does not bear any flowers but only one fruit and that 2-celled, I do not hesitate to refer this species to the genus *Canarium* because of the presence of medullary fibro-vascular bundles both in the stem and in the leaf.[1] Among New Caledonian species it approaches most closely to *C. Balansae* Engl. but is easily distinguished by the greater number of leaflets (15–17 instead of 5–7) and the longer petioles.

MELIACEAE

Dysoxylum glomeratum Vieill. ex C.DC.

Rain forest, base of Mont Mou, no. **2091**; tree about 13 m. tall, with spreading top.

Dysoxylum minutiflorum C. DC.? (*Epicharis minutiflora* Baill?)

Baie des Pirogues, no. **2274**; tree about 13 m. tall.

Aglaia elaeagnoidea Benth. (*Nemedra elaeagnoidea* Juss.).

Small coastal scrub, Noumea, no. **2102**; small tree 7 m. tall.

[1] Ann. Sci. Nat. Bot. sér. 9, x. 290 (1909.)

EUPHORBIACEAE

Glochidion diospyroides Schltr.

Rivière des Pirogues, in small coastal scrub, no. **2278**; tree 10 m. tall.

Phyllanthus baladensis Baill. (*Glochidion baladense* Müll. Arg.; *Phyllanthus adenandrus* Müll. Arg.).

Rain forests Rivière des Pirogues, no. **2253**; shrub 1.75 m. high; fruit yellow.

Phyllanthus Pancherianus Baill? (*Glochidion Pancherianum* Müll. Arg.).

Rather dry forest, base of Mont Mou, no. **2045**; tree 5 m. tall; leaves dull opaque green above, purplish underneath; fruits red.

Resembles very closely Pancher's no. 106 (Mus. Neo-cal. no. 198), which bears in the herbarium of the Museum at Paris the name of *P. Pancherianus* and Vieillard's no. 1190 labelled *P. trigogynus* [*sic*] but differs distinctly from Pancher's no. 371 which is the type labelled in the handwriting of Baillon and from Schlechter's no. 1552 by the very hirsute branches, leaves and pedicels; it is true that the description of Baillon reads "undique pube tenuissima, fulvida conspersus."

Phyllanthus Vieillardi Baill.

Inland from Baie des Pirogues, along edge of rain forests, no. **2246**^{bis}; small tree.

Bureavia carunculata Baill. (*Baloghia ? carunculata* Baill., *Codiaeum caruneulatum* Müll. Arg.)

Rain forests, base of Mont Mou, no. **2086**; small tree.

Baloghia lucida Endl. (*Codiaeum lucidum* Müll. Arg.).

Rain forests, base of Mont Mou, no. **2069**; small tree of 10 m.

Fontainea Pancheri Heck. (*Codiaeum ? Pancheri* Müll. Arg.; *Baloghia Pancheri* Baill.).

Noumea, no. **2098**; small tree of 7 m.; fruit a brilliant orange-red.

Bocquillonia sessiliflora Baill.

Baie des Pirogues, no. **2182**; shrub 2.75 m. high, of upright growth, with few or often only a single stem; young shoots purple, flowers mostly on the old wood.

Bocquillonia spicata Baill.

Rain forests, Rivière des Pirogues, no. **2248**; slender single stemmed tree 7 m. tall but often seen flowering and fruiting as a shrub of less than 2 m.; flowers red, mostly on the old wood but also in the leaf-axils.

Cleidion Vieillardi Baill. (*Macaranga Vieillardi* Müll. Arg., *C. tenuispica* Schltr.)

Rain forests, Rivière des Pirogues, no. **2234**. Shrub about 2.75 m.; monoecious.

Macaranga alchorneoides Pax & Lingelsh.

Rivière des Pirogues, in heavy rain forests, no. **2246**; tree 12 m. tall.

Acalypha neo-caledonica Müll. Arg.

Dombea, no. **2151**; shrub 2 m., of scrambling habit; leaves light green; bracts subtending the female flowers reddish.

Homalanthus nutans Pax (*Croton nutans* Vahl., *Carumbium nutans* Müll. Arg., *Stillingia nutans* Geisel.).

Edge of rain forests, base of Mont Mou, no. **2068**; tree 10 m. tall. Although there are in the axils of the bracts 2 and even 3 flowers, we do not hesitate—Mr. White and myself—to refer this plant to *H. nutans* and not to *H. Schlechteri*.

ANACARDIACEAE

Schinus terebinthifolius Raddi.

Dombea (naturalized), no. **2163**; shrub or small tree mostly 3–5 m. high, of spreading habit; also very common on the hills about Noumea.

Semecarpus atra Vieill. (*Rhus ? atra* Forst.).

Dombea, no. **2161**; tree about 17 m. high, with a dense spreading top; possesses a blistering sap; leaves dark green above, whitish beneath; inflorescence appearing very dark from the dense covering of hairs.

AQUIFOLIACEAE

Phelline microcarpa Baill.

Rain forests, foot of Mont Mou, no. **2084**; small tree.

CELASTRACEAE

Pteripterygia marginata Loes.

Baie des Pirogues, no. **2187**; shrub about 1.50—2 m. high, with light green leaves and white flowers. (Det. C. T. W.)

SAPINDACEAE

Guioa villosa Radlk. (*G. collina* Schltr., *Cupania villosa* Panch. & Seb., nomen.)

Edge of rain forest, base of Mont Mou, very abundant, no. **2076**; a shrub attaining a height of 3 m. but often seen flowering when only about 1 m. high; flowers white.

Cupaniopsis oedipoda Radlk.

Rain forests, foot of Mont Mou, no. **2042**; small tree of 5–7 m.

Elattostachys apetala Radlk. (*Cupania apetala* Labill.).

Rain forest, foot of Mont Mou, no. **2066**; tree about 13 m. high, of very spreading habit, sparsely foliaged, young shoots bright red.

Gongrodiscus sufferrugineus Radlk.

Païta, no. **2174**; tree of 13 m.

Dodonaea viscosa Jacq.

Small coastal scrub, Noumea, no. **2131**; shrub 2.50 m. high.

RHAMNACEAE

Ventilago neo-caledonica Schltr. (*Ventilago leiocarpa* Weberb., non Benth.).

Baie des Pirogues, no. **2206**; climber, climbing over low shrubs and trees on serpentine hills; flowers with an unpleasant odor.

Alphitonia neo-caledonica Guillaumin (*Pomaderris neo-caledonica* Schltr.).

Rain forest, foot of Mont Mou, no. 2075; tree of 20 m., with a spreading top; the bark when freshly peeled has a strong odor of sarsaparilla; fruit black when ripe. Inland from Baie des Pirogues, very common on the serpentine, no. 2114; small tree about 5 m. tall but often fruiting as a shrub of 1.5 m.; bark when peeled has a strong odor of sarsaparilla; local name "Pomaderris." (Det. K. W. Braid.)

ELAEOCARPACEAE

Elaeocarpus persicaefolius Brong. & Gris (*E. polychistus* Schltr. in herb.).

Païta, no. 2170; tree about 20 m. tall, with a spreading top, branches going out almost at right angles; leaves turning bright red when old; fruit blue. Tree very similar in appearance to the common eastern Australian *E. grandis*.

Elaeocarpus rotundifolius Brong. & Gris.

Dombea, no. 2156; a rather handsome tree about 12 m. high with a spreading top; leaves turning red when old as in most species of Elaeocarpus.

GONYSTYLACEAE

Solmsia calophylla Baill.

Rivière des Pirogues, no. 2241; small tree about 10 m. high; leaves very dark glossy green above, pale brown beneath.

STERCULIACEAE

Commersonia echinata Ait.

Edge of rain forest, base of Mont Mou, no. 2071; small slender tree, about 10 m. high, with spreading top.

DILLENIACEAE

Hibbertia altigena Schltr.

Mont Mou, in scrubby patches near and on the summit, no. 2027; shrub 1–1.20 m. high, of dense growth, young shoots suffused with red, leaves turning red when old; calyx silky, suffused with dull red, petals yellow.

Hibbertia Brongniartii Gilg (*H. lucens* Brong. & Gris).

Rivière des Pirogues, no. 2239; tree up to 50 ft. high, with a trunk 30 cm. in diam.; flowers yellow.

Hibbertia lucida Schltr. ex Guillaumin.

Baie des Pirogues, no. 2210; shrub or small tree of 3–4 m., of rather dense growth; flowers yellow.

Hibbertia podocarpifolia Schltr.

Common on edge of rain forest, base of Mont Mou, no. 2053; small tree of 5 m.; flowers yellow.

Hibbertia **trachyphylla** Schltr. (*H. scabra* Brong. & Gris, non R. Br.).

Inland from Baie des Pirogues, no. 2126; shrub about 4 m. high, growing in rather dry forest associated with Melaleuca and Casuarina; flowers yellow.

Tetracera Euryandra Vahl.

Dombea, abundant in open forest, no. 2153; a strong climber.

GUTTIFERAE

Calophyllum caledonicum Vieill. ex Planch. & Triana (*C. montanum* Vieill. ex Planch. & Triana)

Rain forests, Rivière des Pirogues, no. **2251**; tree 20 m. tall; leaves dark glossy green above, paler beneath.

Garcinia amplexicaulis Vieill. ex Pierre (*Clusianthemum amplexicaule* Vieill.).

Inland from Baie des Pirogues, no. **2123**; shrub 1.50 m., fairly common; flowers red.

Garcinia corymbosa Wall. (*Discostigma corymbosa* Panch. & Seb., *Garcinia Pancheri* Pierre, *Clusia Puat* Montr.).

Païta, no. **2175**; tree 12 m. tall; petals white, very thick and fleshy; stamens numerous and purple.

Montrouzieria sphaeroidea Panch. ex Planch. & Triana (*M. spheraeflora* Panch. in Panch. & Seb.).

Rivière des Pirogues, no. **2124**; shrub 3–4 m. high, of upright growth. Closely related to *M. rhodoneura* Schltr.

VIOLACEAE

Agation Deplanchei Brong. & Gris ex Guillaumin.

Rivière des Pirogues, no. **2236**; climber.

Hybanthus austro-caledonicus Schinz & Guillaumin (*Ionidium austro-caledonicum* Vieill.).

Rain forest, Rivière des Pirogues, no. **2247**; a small slender tree 10 m. tall; flowers white, lower lip with a few purple spots.

Hybanthus ilicifolius Schinz & Guillaumin forma **serratifolia** Guillaumin (*Ionidium serratifolium* Bak. f.).

Rain forests, Rivière des Pirogues, no. **2254**; a small very slender tree 5 m. high, but often flowering as a shrub of about 1.5 m.; leaves dark green above, paler beneath; corolla lobes cream-colored, marked with purple.

FLACOURTIACEAE

Xylosma suaveolens Forst.

Rain forest, base of Mont Mou, no. **2094**; a small tree.

Homalium Francii Guillaumin. Rain forests, base of Mont Mou, no. **2040**; small slender tree about 7 m. tall; flowers in racemes, greenish suffused with red; filaments pink.

Casearia silvana Schltr.

Rain forest, base of Mont Mou, coll. *Garigou*, no. **2037**; small tree, flowers white, in dense lateral and axillary clusters.

Microsemma salicifolia Labill.

In small coastal scrub, Noumea, no. 2140. Small tree 5 m., densely foliaged.

RHIZOPHORACEAE

Rhizophora mucronata Lam.

Mangrove swamps, mouth of the Rivière des Pirogues, no. **2282**; small

tree about 7 m. tall, with long, stilt (aërial) roots growing down into the mud from the larger branches.

Bruguiera eriopetala Wight & Arn. (*B. Rumphii* Bl.).

Mangrove swamps, mouth of Rivière des Pirogues, no. 2262; small trees mostly about 5 m.; trunk somewhat flanged at the base; roots developing a number of hard knobby pneumatophores; leaves on young vigorous shoots coppery red underneath.

Crossostylis grandiflora Brong. & Gris (*C. Sebertii* A. Gris). Rain forests, base of Mont Mou, no. 2017; tree 10 m. tall; flowers in bud only, buds 4-angled, calyx-lobes white, tinged with pink (flesh-colored), very thick; petals much smaller.

COMBRETACEAE

Lumnitzera coccinea Wight & Arn.

Mangrove swamps, mouth of the Rivière des Pirogues, no. 2281; shrub of 3 m., branching from near the base; the roots forming pneumatophores similar to those of Bruguiera but smaller.

MYRTACEAE

Myrtus paitensis Schltr.

Rain forest, base of Mont Mou, no. 2050; shrub about 2 m. high; flowers white.

Myrtus paitensis var.

Mont Mou, no. 2003; shrub, about 1.5 m. high; young branchlets and leaves reddish; flowers white.

Myrtus rufo-punctatus Panch. ex Brong. & Gris.

Mont Mou, scrubby slopes of hills, 1000 m. alt., no. 2023; shrub about 1 m. high; leaves becoming red with age; fruit black, of agreeable flavor.

Myrtus turbinatus Schltr.

Baie des Pirogues, no. 2128; shrub 1 m. high; flowers greenish white.

Rhodomyrtus andromedoides Brong. & Gris.

Rivière des Pirogues, no. 2103; small tree 7 m. high; flowers cream-colored.

Psidium guajava L.

Noumea, naturalized along roadsides, no. 2289; shrub or small tree.

Eugenia Gacognei Montr. (*E. Homei* Seem.).

Baie des Pirogues, without no.; shrub.

Calycorectes rubiginosa Guillaumin (*Schizocalyx rubiginosa* Brong. & Gris, *Spermolepis rubiginosa* Brong. & Gris).

Baie des Pirogues, coll. *A. Varin*, no. 2225; tree.

Syzygium laterifiorum Brong. & Gris.

Dombea, no. 2159; tree 12 m. tall, with densely foliaged head; leaves dark green above, paler beneath.

Syzygium multipetalum Panch. ex Brong. & Gris (*Eugenia multipetala* Bak. f.).

Rivière des Pirogues, no. 2258; tree 12 m. tall, with spreading dense head; fruit 1 cm. in diam., first white, later red or blackish red.

Syzygium patens Panch. ex Brong. & Gris (*Eugenia patens* Panch. ex Bak. f., *Eugenia ngoyensis* Schltr.)

Rivière des Pirogues, no. **2110**; shrub 1 m. high; flowers white, flushed red.

Syzygium sp.?

Rivière des Pirogues, no. **2227**; tree about 13 m. tall, leaves lustrous dark green above, paler beneath; fruit subglobose or pyriform, 4 cm. in diam., dark red. The fruit which is detached may possibly not belong to this specimen.

Piliocalyx Baudouini Brong. & Gris.

Rain forest, base of Mont Mou, no. **2074**; tree 12 m. tall; fruit large, white.

Xanthostemon rubrum Niedenzu.

Baie des Pirogues, without no.; small tree.

Xanthostemon sp., aff. *X. macrocephalum* Pampan.

Baie des Pirogues, in scrub on serpentine hills, no. **2202**; small tree.

Spermolepis gummifera Brong. & Gris (*S. tannifera* Heck.).

Rivière des Pirogues, no. **2252**; tree 20 m. or more high, with a spreading top. The principle hardwood of the island being to New Caledonia what the hardwood eucalypts are to Australia; timber largely cut but all used locally, not exported. Local name "Chêne Gomme."

Moorea artensis Montr. (*Cloezia ligustrina* Brong. & Gris). Dombea, no. **2157**; shrub about 3 m. high.

Moorea artensis var.?

Baie des Pirogues, no. **2192**; shrub 1–1.75 m. high; petals yellow.

Moorea canescens Beauvis. (*Cloezia canescens* Brong. & Gris; perhaps identical with *M. Deplanchei* Guillaumin [*Cloezia Deplanchei* Brong. & Gris]).

Baie des pirogues, no. **2179**; shrub 2 m. high, of rather spreading habit.

Moorea floribunda Guillaumin (*Cloezia floribunda* Brong. & Gris). Rather dry forest, base of Mont Mou, no. **2051**; tree about 7 m. tall.

Tristania Callobuxus Niedenzu (*Tristaniopsis Callobuxus* Brong. & Gris).

Rivière des Pirogues, no. **2108**; small tree about 7 m. tall, with spreading top and dense foliage.

Tristania glauca Pancher (*Tristaniopsis glauca* Brong. & Gris).

Inland from Baie des Pirogues, no. **2106**; shrub 1.75 m. high.

Melaleuca Leucadendron L. (*M. viridiflora* Gaertn.).

Dry, scrubby hillsides, Noumea, very abundant, without no.; small tree mostly about 5 m. high; anywhere near towns the trees do not get a chance to attain any size owing to their being so much cut for firewood. In swamps near Mouth of Rivière des Pirogues, no. **2266**; tree about 13 m. tall, with a papery bark; when growing in swamps, not regarded as very satisfactory for fuel.

Melaleuca pungens Brong. et Gris.

Rivière des Pirogues, among rocks and along the river banks, usually leaning over the water, no. 2229; small tree about 4 m. tall but often seen flowering as a shrub of 1 m.; bark white, papery.

Baeckea ericoides Brong. et Gris.

Mont Mou, on open exposed scrubby hillsides, no. 2019; shrub 1.75 m. high, flowers white. Also seen at Baie des Pirogues.

Baeckea virgata Andr. (*B. parvula* DC., *Leptospermum parvulum* Labill.).

Edge of rain forest, base of Mont Mou, no. 2077; slender shrub of 3 m.; flowers white.

MELASTOMACEAE.

Melastoma denticulata Labill. Edge of rain forest, base of Mont Mou, no. 2018; shrub 2 m. high; flowers white.

ARALIACEAE

Meryta coriacea Baill.

Rivière des Pirogues; no. 2242; very slender tree about 10 m. high, usually with a single stem and with a tuft of leaves at the top; flowers bright lemon-yellow, in large terminal clusters.

Schefflera Gabriellae Baill.?

Rain forests, Rivière des Pirogues, no. 2244; slender tree about 13 m. tall.

Schefflera golip Baill.

Païta, no. 2176; tree about 13 m. tall.

Tieghemopanax austro-caledonicus R. Vig. (*Panax austro-caledonica* Baill., *Panax crenata* Panch. & Seb., *Polyscias austro-caledonica* Harms, *Aralia Gemma* Linden). Rain forest, base of Mont Mou, no. 2082; tree about 7 m. tall, with a spreading top.

Tieghemopanax dioicus R. Vig. (*Cussonia dioica* Vieill., *Polyscias dioica* Harms).

Rain forest valleys, inland from Baie des Pirogues, no. 2127; tree about 13 m. tall; flowers deep purple.

Myodocarpus fraxinifolius Brong. & Gris.

Rivière des Pirogues, no. 2228; tree 13 m. tall, with spreading top.

Myodocarpus involucratus Dub. & R. Vig.

Rivière des Pirogues, no. 2259; small soft wooded tree, about 7 m. tall; leaves light green.

EPACRIDACEAE

Leucopogon albicans Brong. & Gris.

Rivière des Pirogues, no. 2107; shrub 1 m. high; leaves light green above, whitish beneath; fruits small, red.

Leucopogon cymbulae Labill. (*L. Billardieri* Montr.)

Rather dry forests base of Mont Mou, no. 2057; small tree about 7 m. tall.

Leucopogon dammarifolius Brong. & Gris.

Rather dry forests, base of Mont Mou, no. 2044; tree about 7 m. tall; young shoots suffused with red; fruits red. Summit of Mont Mou, no.

2028; shrub 3–4 m. high; young shoots enclosed in bracts, when newly open very beautiful, the young leaves suffused with pink and glaucous beneath; fruit deep orange-color.

Dracophyllum gracile Brong. & Gris. (*D. cosmelioides* Panch. ex Brong. & Gris.).

Rivière des Pirogues, growing among rocks in the river, no. **2271**; shrub about 1 m. high.

Dracophyllum ramosum Panch. apud Brong. & Gris (*D. amabile* Brong. & Gris).

Inland from the Baie des Pirogues, no. **2115**; shrub about 3 m. high, of slender growth; flowers white.

Dracophyllum verticillatum Labill.

Mont Mou, on open exposed hillsides among scrubby vegetation, no. **2014**; a very beautiful shrub, with the flowering spike about 1.75 m. high; flowers white, buds tinged with pink, slightly honey-scented.

MYRSINACEAE

Rapanea asymmetrica Mez.

Mont Mou in scrubby patches on hillsides, no. **2029**; shrub of 2 m.; fruit small, green, streaked or dotted with brown.

Tapeinosperma Pancheri Mez.

Rain forests, base of Mont Mou, no. **2056**; slender tree 10 m. tall; secondary branches of panicle, pedicels and calyces red; fruit green with dark streaks.

Tapeinosperma Whitei Guillaumin, n. sp.

Arbor, 10 m. alta, ramulis crassis, foliis obovatis (usque ad 15 : 7 cm.), basi rotundatis, apice rotundatis vel obtusissimis crassis glabris pagina inferiore punctis multis albido-pulverulenta, nervis 11–13-jugis, utrinque parce prominulis, venis immersis, petiolo brevi sed distincto, 0.4–1 cm. longo. Inflorescentiae terminales, bipinnatim paniculatae glaberrimae, pedicellis 4–5 mm. longis, floribus 3 mm. longis, sepalis late ovatis 2 mm. longis crassis atro-punctatis glaberrimis, petalis fere ad ½ connatis ovatis apice subacuminatis, parte libera punctatis, extra glaberrimis, intus fauce dense lepidota, staminibus sessilibus, petalis 2-plo minoribus, ellipticis, facie interiore medio apiceque punctis 2 atris elongatis, facie exteriore ab apice usque ad medium zona atra notatis, apice lepidotis, ovario globoso glabro atro-punctato stylum fere aequante, stylo subulato.

Rivière des Pirogues, no. **2280**; tree 10 m. tall.

The present species through its punctate sepals and petals and its corolla squamous at the mouth constitutes a passage between *C. nectandroides* and *C. deflexum*, *C. clethroides* and *C. robustum;* it is equally well characterized by the ornamentation of its stamens.

Maesa novo-caledonica Mez.

Rain forests, base of Mont Mou, no. **2079**; climber, climbing to the tops of forest trees; fruits pale straw-colored with darker lines; bark said to be used as a fish poison by the natives.

SAPOTACEAE

Planchonella Pancheri Pierre (*Sideroxylon cinereum* Baill.).
Noumea, in small coastal scrub, no. **2100**; tree 7 m. tall.

EBENACEAE

Maba parviflora Schltr.
Rivière des Pirogues, in heavy rain forests, no. **2245**; tree about 13 m. tall.
Diospyros macrocarpa Hiern.
Rain forests, base of Mont Mou, no. **2067**; tree about 13 m. tall; loaded with large pink egg-shaped fruits weighing down the branches.

OLEACEAE

Notelaea Badula Vieill. (*Osmanthus Badula* Hutchins. ex S. Moore).
Rivière des Pirogues, overhanging water courses, no. **2184**; tree 5 m. tall; flowers white.
Notelaea vaccinioides Schltr. (*Osmanthus vaccinioides* Hochr.)
Baie des Pirogues, no. **2200**; shrub 2 m. high.
Notelaea vaccinioides Schltr.?
Rivière des Pirogues, bordering on mangrove swamps, no. **2267**; small tree 5 m. tall.

LOGANIACEAE

Geniostoma foetens Baill.
Rain forests base of Mont Mou, no. **2043**; shrub 2.75 m. high, of very dense compact growth; flowers greenish white, with a very foetid odor like excrement.
Fagraea Schlechteri Gilg & Benedict (*F. grandis* Panch. & Seb., non *Carissa grandis* Bert. = *F. Berteriana* A. Gray),
Rain forests, base of Mont Mou, no. **2083**; tree 13 m. tall, with a spreading top.

APOCYNACEAE

Melodinus Balansae Baill. (*M. inaequilatus* Baill., *M. intermedius* Panch. ex Guillaumin.).
Rivière des Pirogues, no. **2270**; climber with milky juice.
Alstonia plumosa Labill.
Rain forests, base of Mont Mou, no. **2038**; tree about 10 m. tall; bark grey; leaves glossy green above, pale and opaque beneath; flowers white. Dombea no. **2162**; tree about 13 m. tall, with a light colored bark; flowers white.
Alstonia Vieillardi Van Heurck & Müll. Arg. (*A. Durkeimiana* Schltr.).
Rain forests, base of Mont Mou, no. **2054**; slender tree 13 m. tall; flowers yellow.
Tabernaemontana cerifera Panch. & Seb.
Rivière des Pirogues, no. **2193**; tree 7 m. high but often seen flowering as a shrub of 1.75–2 m.; flowers white, strongly jasmine-scented; fruit consisting of two boat-shaped follicles each 7 cm. long and 3.5 cm. wide but not seen quite ripe.

Rauwolfia semperflorens Schltr. (*Alyxia semperflorens* Panch.)

Rain forests, base of Mont Mou, no. **2049**; shrub 2 m. high, flowers white. Rivière des Pirogues, no. **2191**; shrub 1.75 m. high; flowers white; fruits small, blue-black.

Alyxia celastrinea Schltr. (*Gynopogon celastrineum* Baill.)

Noumea, in small coastal scrub, nos. **2139** and **2141**; shrub 1.75 m. high, with milky sap; fruits black.

Alyxia celastrinea Schltr.?

Noumea, in small coastal scrub, no. **2150**; shrub 1.75 m. high, of rather scrambling habit.

Alyxia leucogyne Van Heurck & Müll. Arg. (*A. grandis* Panch. & Seb., *A. sapiifolia* Schltr., *Gynopogon leucogyne* Baill.).

Rivière des Pirogues, no. **2249**; climber.

Pterochrosia Vieillardi Baill.

Rivière des Pirogues, no. **2260**; tree 13 m. high or more, with a candelabrum-like habit of branching; branchlets exuding an abundant milky sap when cut; flowers white.

Ochrosia miana Baill.

Rain forest valleys, inland from Baie des Pirogues, no. **2117**; tree 20 m.; fruits large, orange-colored.

Cerbera manghas L. (*C. Linnaei* Montr.).

Dombea, common everywhere along streams and on edge of the rain forest, no. **2167**; tree 13 m. tall; branchlets very milky when cut; flowers white with an orange throat, strongly scented.

VERBENACEAE

Lantana Camara L.

Noumea, naturalized along road-sides, etc., no. **2146**; shrub, mostly about 1 m. high of scrambling habit; flowers from almost white to dark pink, with usually orange throat. Noumea, no. **2142**; a form with bright red flowers. (Det. C. T. W.)

Vitex trifolia L.

Noumea, along the harbor front, no. **2148**; shrub 3 m. high, of spreading habit; flowers lavender.

Oxera robusta Vieill.

Rain forests, base of Mont Mou, no. **2088**. Liane climbing to the tops of forest trees.

Clerodendron inerme R. Br.

Noumea, along the harbor front, no. **2145**; shrub 2-3 m. high of very rambling habit; corolla white; filaments purple, long-protruding. (Det. C. T. W.)

Avicennia officinalis L. (*A. resinifera* Forst. f.).

Noumea, along the harbor front a little below high-water mark, no. **2147**; tree 10 m. tall; leaves dark green above, whitish underneath; flowers orange-colored, honey-scented.

SOLANACEAE

Duboisia myoporoides R. Br.

Rain forests, base of Mont Mou, no. 2080; tree 13 m. tall; bark thick and corky; flowers white.

BIGNONIACEAE

Diplanthera Deplanchei F. Muell.

Rain forests, base of Mont Mou, no. 2060; tree 20 m. tall; calyx bronze-red; corolla and stamens yellow. Also seen at the Rivière des Pirogues. (Det. C. T. W.)

GESNERACEAE

Coronanthera pedunculata C. B. Clarke var. **stellata** C. B. Clarke.

Base of Mont Mou, no. 2057; small tree, overhanging water courses in rain-forests, of straggling growth, about 7 m. high; leaves dark green above, pale beneath; flowers cream-colored, with dark streaks often suffused with pink.

ACANTHACEAE

Acanthus ilicifolius L. Tidal swamps, Dombea, no. 2165; shrub 1.25 m. high; corolla-lip white in the lower half, lavender in the upper half. (Det. C. T. W.)

RUBIACEAE

Gardenia lucens Panch. et Seb.

Noumea, in small coastal scrub, no. 2101; tree 5–7 m. tall.

Gardenia platyxylon Vieill. ex Panch. & Seb.

Noumea, coastal scrub, no. 2138; small tree 5 m. high.—On account of its elongated fruit this species seems to be referable to the genus Atractocarpus.

Timonius platycarpus Montr. (*Guettarda fusca* Pancher ex Baill.).

Rivière des Pirogues, no. 2275; shrub 2 m. tall; flowers white.

Psychotria calothyrsus Guillaumin, comb. nov. (*Uragoga calothyrsus* Baill.).

Rain forests, base of Mont Mou, without no.; shrub; fruits white.

Psychotria Fagueti Schltr. (*Uragoga Fagueti* Baill.; *Cephaelis Fagueti* S. Moore)? vel *P. Schumanniana* Schltr. (*Cephaelis Schumanniana* S. Moore)?

Mont Mou, in rain forest at the top of the mountain, no. 2034; shrub about 3 m. high; fruit hairy, purple.

Psychotria oleoides Schltr. (*Uragoga oleoides* Baill.).

Rivière des Pirogues, no. 2250; tree 7 m. tall; flowers greenish white.

Psychotria Pancheri Schltr. (*Uragoga Pancheri* Baill., *Cephaelis Pancheri* S. Moore).

Rain forests, base of Mont Mou, no. 2089; small tree.

Psychotria rubiginosa Guillaumin (*P. Pancheri* var. *rubiginosa* Baill. in herb.).

Rain forests, base of Mont Mou, no. 2062; small tree about 5 m. high; flowers in a dense terminal sessile head surrounded by white bracts.

Psychotria rupicola Schltr. (*Uragoga rupicola* Baill.).

Inland from Baie des Pirogues, no. **2104**; shrub 1.75 m. high; branches of panicle and flowers white.

Psychotria sp. nov.

Rain forest, base of Mont Mou, very common, no. **2059**; shrub about 1.25 m. high, calyx dull red, corolla deep rose-pink; fruit blue.

Mapouria Balansae Beauvis. (*Uragoga Balansae* Baill., *Cephaelis Balansae* S. Moore).

Mont Mou, in rain forest on the top of the mountain, no. **2035**; shrub 2 m. high; fruit dark purple.

Mapouria Deplanchei Beauvis.? (*Douarrea alba* Montr.? *Mapouria Douarrei* Beauvis.?).

Rain forests, base of Mont Mou, no. **2061**; shrub 1.50 m. high; fruits white.

Mapouria speciosa Beauvis. (*Douarrea speciosa* Montr., *Psychotria speciosa* S. Moore). Rain forests, base of Mont Mou, nos. **2004** and **2090**; shrub 2 m. high; branches of inflorescence red; calyx red, corolla pink.

Normandia neo-caledonica Hook. f.

Mont Mou, in open scrubby situations, no. **2007**; a low shrub 0.75 m. high; leaves glossy, green above, very pale beneath; flower white with a faint purplish tinge.

Morinda Forsteri Seem. (*M. umbellata* Forst.; non L.).

Noumea, in small coastal scrub, no. **2134**; climber, climbing over small trees and shrubs; flowers yellow, sweetly scented.

GOODENIACEAE

Scaevola Beckii Zahlbr.

Mont Mou, exposed scrubby hillsides, no. **2012**; mostly an unbranched undershrub, about 0.75 m. high; leaves coriaceous, turning red when old, corolla lobes white on the upper face, brownish below.

Scaevola cylindrica Schltr. & Krause.

Rivière des Pirogues, no. **2232**; spreading shrub, 2 m. high; flowers white.

Scaevola saligna Forst. f. (*S. montana* Labill.).

Edge of rain forest, base of Mont Mou, no. **2065**; shrub 1 m. high, of spreading habit; corolla-lobes white on inner face, back of corolla and corolla-tube cream-colored. Noumea, in small coastal scrub, no. **2137**; shrub 1.25 m. high, of spreading habit; flowers white suffused with purple. Baie des Pirogues, no. **2195**; shrub 1.25 m. high, of spreading habit; flowers white; fruits purplish black, fleshy.

COMPOSITAE

Helichrysum neo-caledonicum Schltr.

In dry forests and edge of rain forests, base of Mont Mou, no. **2055**; shrub about 1.50–2 m. high, of dense growth and spreading habit and of grayish appearance.

THE LIGNEOUS FLORA OF HOT SPRINGS NATIONAL PARK AND VICINITY

ERNEST J. PALMER

THE Hot Springs National Park, embracing the hot springs in Garland County, central Arkansas, and an area of mountainous country about two miles square surrounding them, which is in part the subject of this phytographic study, was the first reservation of this character made by the federal government for the benefit of the public. It therefore has a special historical interest as the nucleus of that magnificent system of national parks and monuments which is preserving for us so many of the most beautiful and wonderful works of nature in various parts of the country, some of which might otherwise have been impaired by commercial exploitation or at least have long remained inaccessible to many of those who may now enjoy them. Unlike most of the other parks, however, the reason for setting aside this first national resort was not primarily on account of its scenic beauty, although it is not without valid claims in that direction. But it was due to the fact that the federal authorities in charge of administering the affairs of the Missouri, and later of the Arkansas Territory, in which they were located, early realized the necessity of establishing a permanent and more rigid control over the hot springs, which even then were resorted to by many travelers for the supposed therapeutic value of the waters.

The first act of Congress establishing the National Park was passed in 1834, the lands surrounding the hot springs having been ceded to the United States by the Quapaw Indians in 1818. The park as originally bounded contained a little over 2500 acres, but this area has since been somewhat diminished by the establishment of the town of Hot Springs in 1876, to which the government ceded, by gift, lands for street and alley purposes. The town or city claims at present a permanent population of about 15,000, while the number of tourists and guests domiciled there at some seasons probably exceeds twice that number. It is a little city of hotels, apartments and bath houses, picturesque and attractive both by reason of its natural environments and the progressiveness of its citizens. Practically all business is based upon the principal industry of catering to the tourists, in addition to which there are some small lumber mills and a limited agriculture in the surrounding country. The population of the town is largely American but has been drawn from many sources, and visitors of all classes are attracted from every part of the United States and many from abroad. The student of humanity will not fail to note here the curious contrasts that result from the mingling of this cosmopolitan crowd with the somewhat primitive inhabitants of the surrounding country. It may be noted also that a spirit of friendliness, courtesy and fair dealing on the part of the townspeople towards visitors prevails to a degree not always met with in similar places.

The earliest visitors who came to the hot springs to "take the baths"

and seek health from its mysterious waters were undoubtedly of the prehistoric tribes that inhabited the region long before its discovery by white men. This fact is attested both by tradition and archaeological evidence. It is said that the locality was held as neutral territory by the various hostile tribes, and that they laid aside their feuds and their war clubs when they gathered here to enjoy the gifts of the great Manitou who presided over it. How much of this is fact and how much poetic fancy it is impossible to say. But there was another incentive besides the hot springs that attracted the red men to the locality, of which more substantial evidence remains: this was the deposits of novaculite, which outcrop on several of the mountains surrounding the springs, and which afforded a resource perhaps even more important to the barbarian culture of those times than is the iron of Michigan or the coal of Pennsylvania to the civilization of our own. This fine grained silicious rock, on account of its clear conchoid fracture, could be shaped readily into a keen cutting edge, and because of its superior quality for the manufacture of weapons and domestic tools it became the basis of an important primitive industry and barter. Some of the beds were extensively, though no doubt intermittently worked, probably for many centuries, and artifacts from this source are found scattered over a wide territory, especially to the south, through the Red River valley and to the Gulf of Mexico.

The first white men supposed to have visited the Hot Springs region were Ferdinand de Soto and his followers, who towards the middle of the sixteenth century set out to explore the great continental province, then known as Florida, in search of fabled mines and populous cities, which they confidently believed would rival those of Mexico and Peru. In the course of their wanderings through the trackless forests and swamps of the lower Mississippi Valley, having crossed that great river somewhere below the present site of Memphis, they turned to the west, traversing parts of the rugged Ozark region until they reached an Indian town on the Ouachita River. Here they spent about three months of the winter of 1541–42, being detained, as the historian of the expedition relates, by deep snows. This circumstance would seem to indicate an unusually severe winter at that date, as the snowfall recorded at present in the locality is generally very light or entirely lacking.

Although the references by the historians of de Soto's expedition to this part of their travels, as indeed to the geography of the entire journey, is somewhat vague and uncertain, there can be little doubt that their route led them through this locality, and that it was from their winter camp somewhere in the vicinity of the hot springs that this gallant and unfortunate adventurer, the cavalier Ferdinand de Soto, set forth on the last tragic stage of his wanderings, that were to end for him a few months later in a watery grave beneath the floods of the great river he had discovered. The de Soto cold spring in the National Park is indeed supposed to commemorate the visit of the Spaniards to the locality and to mark

the site of their camp, but its claim to any authentic connection with the event probably rests on no better foundation than a poetic tradition of a much later date.

It was many years after the visit of the Eldorado-seeking Castilians before we again hear any account of the hot springs or their vicinity. In the two and a half centuries intervening between that event and the exploration by a party connected with the Lewis and Clark expedition of 1804, trappers, hunters and travelers must have found their way there from time to time without leaving any account of the event, for it is stated in the report at that time that white men were already visiting the springs for the purpose of taking the baths. The curious circumstance that this extremely interesting locality was for so long a time overlooked by the various travelers who explored and described the lower Mississippi valley and the Louisiana Territory, is only to be accounted for by the fact that it lay in a rugged and inaccessible country, some distance away from any of the great navigable rivers, which then furnished the only main avenues of travel through the uncharted wilderness.

Du Pratz, in his History of Louisiana,[1] does not mention the hot springs, which were then included within that province, and Darby merely alludes to them in a brief paragraph.[2] Even the energetic and scientifically enthusiastic Nuttall, on his remarkable journey up the Arkansas River in 1819, does not appear to have visited the locality, but gives a brief description of it based upon information received from others.[3] It would appear, however, that the hot springs were rather well known at that time, for in another place he mentions them as amongst the resorts frequented by "Southern gentlemen who pass their summers in quest of health and recreation."

Schoolcraft[4] visited the hot springs in 1819 and Featherstonehaugh[5] in 1835, and both published brief accounts of the geology. Descriptions of the geological formations of the Ouachita Mountains and of the hot springs, or references to them have appeared in several other works: Amongst the most important of these are the reports of Owen,[6] 1860, and of Williams,[7] 1891. A brief general description of the hot springs and the National Park, by J. K. Hayward, with a geological sketch by Walter

[1] Du Pratz, M. Le Page. Histoire de la Louisiane. Paris, 1758.—English translation, London, 1774.

[2] Darby, William M. State of Louisiana, 176-177. New York, 1817.

[3] Nuttall, Thomas. Journal of Travels into the Arkansas Territory, during the year 1819, 215-216. Philadelphia, 1821.

[4] Schooleraft, Henry Rowe. A view of the lead mines of Missouri, including some observations on the mineralogy, geology, geography, antiquities, soil, climate, population and productions of Missouri and Arkansas, and other sections of the Western Country. New York, 1819.

[5] Featherstonehaugh, G. W. Geological Report of an examination made in 1834 of the Elevated Country between the Missouri and Red Rivers. Washington, 1835.

[6] Owen, David Dale. Second Report of a Geological Reconnoissance of the Middle and Southern Counties of Arkansas, made during the years 1859 and 1860. Philadelphia, 1860.

[7] Williams, J. Francis. The Igneous Rocks of Arkansas, Annual Report of the Geological Survey of Arkansas, II. Little Rock, 1891.

Harvey Weed, was published by the United States government in 1902.[1] Some of the facts in this introduction have been drawn from these sources.

While it thus appears that the extremely interesting geology of the Hot Springs region has not been neglected during the past hundred years, very little attention seems to have been given to the botany, although, judging from the several brief visits which the writer has been able to make there recently, it possesses an unusually rich and varied flora, which offers an attractive field for exploration in that direction.

In Branner and Coville's list of the Plants of Arkansas several species are recorded as having been collected at Hot Springs, and incidental references to the plants of this region have appeared in various publications. Dr. George Engelmann of St. Louis, Mr. G. W. Letterman of Allenton, Missouri, Mr. Richard D'Ailly of Little Rock, Dr. F. V. Coville, and Professor F. L. Harvey, the last named, during his connection with the Arkansas Industrial University at Fayetteville, did some plant collecting about Hot Springs during the nineteenth century, and probably a number of other botanists have also visited the locality. But, so far as I have been able to discover, no systematic list of the plants nor general botanical description of the region has yet appeared.

The present botanical sketch and list of the ligneous plants is based on observations and collections made on several short visits to Hot Springs during the years 1923, 1924 and 1925. The aggregate time spent in the vicinity was between two and three weeks, mostly in excursions afoot in the National Park and for some miles beyond, and it was about equally divided between the spring and autumn seasons. An attempt was made to collect and identify all of the woody native and spontaneous plants seen; but as each trip has added something new to the list, and as the very rugged and diverse region could be only very partially explored in so brief a time, it is quite probable that some species have still been overlooked. In addition to the 200 species and varieties of woody plants of the following list, between two and three hundred herbaceous species were also collected, of which a complete list cannot be given here, but incidental reference will be made to some of them in connection with the general description of the region and of the ligneous flora. A complete set of specimens of the woody plants is deposited in the herbarium of the Arnold Arboretum, and duplicates of most of them are in the herbaria of the Missouri Botanical Garden and the University of Arkansas; specimens of many of the herbaceous plants have also been sent to the last two institutions.

The limits of the area included in this survey, and from which the plants of the appended list were taken, extends from the Big Chalybeate Spring, about three miles northwest of the town of Hot Springs, to the Ouachita River on the south, from the bridge on the Arkadelphia road to the village of Lawrence, and eastward to a little beyond High Point, a

[1] Senate Document no. 282. Washington, 1902.

flag station on the Missouri Pacific railroad, or in general within a radius of from four to ten miles of the town. However, it was possible to explore thoroughly only a small part of this area, most of the collecting having been done on the mountains in the National Park and in the immediate environs of the town, in the valley of Hot Springs Creek to the Ouachita, and along the various branches and tributaries of Gulpha Creek.

The Ouachita Mountains occupy the southeastern extremity of the great interior elevation broadly designated as the Ozark region. Both in geological history and structure they are, however, quite distinct from the main Ozark plateau and Boston Mountains, to which the name is sometimes and more accurately restricted. The topography and rock formations are also very different from those of the mountains to the west, in west-central Arkansas and eastern Oklahoma. The rocks of the Ouachita Series consist of rapidly alternating beds of shale, sandstone, quartzite, conglomerate and novaculite. These represent a long succession of marine deposits extending from Ordovician to Sub-Carboniferous time. These originally horizontal strata have been broken up, folded and tilted in a very complex manner. Dikes of a fine grained black syenitic rock traverse them in various directions, and masses of granite occur a few miles east of Hot Springs and near Magnet Cove and Little Rock. The time in geologic history when the upheaval of the mountains occurred, and consequently the age of the intrusive rocks, is indicated by the contact of the latter with beds of Cretaceous limestone that are found locally in some parts of the area. Ash beds and other evidences of volcanic activity have been identified in places, and the hot springs are evidently the last lingering activity of this period of disturbance.

The mountains in the vicinity of Hot Springs are mostly in the form of extended chains or ridges, divided by narrow valleys. The general trend is from northeast to southwest. The sharp crests of the ridges are formed by the upturned edges of hard thick beds, usually of novaculite or quartzite; in most cases these stand at an angle of 45 degrees or higher from the horizontal. Most of the hills are of moderate height, their tops seldom exceeding six or seven hundred feet above the dividing valleys. The valley of the Ouachita River a few miles south of Hot Springs has a minimum elevation of a little less than three hundred feet above mean Gulf tide, and the crests of a few of the highest mountains slightly exceed 1300 feet. Besides the hot springs, many cold springs issue from the bases of the mountains, which, together with the rather abundant rainfall, give rise to numerous perennial or intermittent streams, all of which ultimately find their way into the Ouachita River.

The Ouachita River is the largest stream traversing the region and the only one of much consequence. Just south of Hot Springs, after it has received the Mazern Creeks from the south and several other tributaries, it is an imposing stream of considerable volume, sometimes over one hundred yards in width. The banks are in many places steep and rocky,

but are not characterized by high perpendicular bluffs such as are found along most of the streams farther north in the Ozark region. Near the mouth of Hot Springs Creek the river has cut its way through a gap in the mountains, and its waters spread out into shallow ripples and rapids as they dash across the upturned strata that cross its channel. The scenery here is quite wild and picturesque and there is much of botanic as well as of geologic interest. This locality will be mentioned again in connection with a description of the flora. The river, the Indian name of which has been variously spelled: Wachitta, Washitaw, Washita, Ouachitta and Ouachita, has its rise in the high lands to the west, near the Oklahoma line, and it joins the Red River in Louisiana, just above its confluence with the Mississippi. The principal tributaries of the Ouachita, within the area we are considering, are Hot Springs Creek and Gulpha Creek, with its several branches.

Hot Springs Creek, as its name indicates, has its origin in the thermal springs that issue from the base of the mountain of the same name. It flows almost directly south for its total length of about five miles to its junction with the Ouachita. In this short distance it has a fall of about 300 feet through its narrow rocky valley. In its primitive condition it must have been a most romantic and beautiful little stream. At present its upper course is obscured or completely concealed by the city, and through a very short-sighted policy its valley a mile or two below has been made a public dumping ground, and the city sewers allowed to discharge into it instead of being carried directly to the river. The greater part of its course is marred by this profanation, but in spite of it there is still some quite picturesque scenery in the lower portion, where the stream has cut through the syenite dikes and the waters dash among great masses of rock. This creek in its short course receives no tributaries except the intermittent floods of numerous ravines and a few small seeping springs. In times of heavy rainfall, however, the run-off from the surrounding hills is very considerable, and the stream carries a great volume of water down to the river.

The valley of Hot Springs Creek is narrow, in some places the rocky hills extending quite to the margins of the stream, and in its widest parts it seldom exceeds three or four hundred yards across. It has scarcely reached the stage in the cycle of development where real alluvial flood plains are developed, and the surface is more or less rocky throughout its entire extent. The accumulations of residual soil, however, are sufficiently great to support a rich and varied flora, differing markedly from that of the surrounding hills. The difference consists largely in the greater wealth of species found here, most of the trees and shrubs of the uplands extending into the valley where they are associated with many other species both ligneous and herbaceous, that are restricted to the latter zone. Owing to the narrow limits of the valley and the generally rocky character of the land but little of it has been cleared. No doubt

there has been much thinning of the forest, resulting in a considerable modification of its primitive condition, and some species may even have disappeared; on the other hand a number of introduced species are now found, especially in the upper part, but for the most part the flora is still intact and probably retains much of its original composition.

Gulpha Creek, which joins the Ouachita some six or seven miles farther down its course, is a somewhat larger stream than that originating in the hot springs. Its several branches have their sources in the mountains lying to the east and northeast of the town and National Park. Its principal forks are East Branch, Middle Branch, or Mill Creek, and West Branch. The two latter unite to form the main stream about five miles above its mouth, and the East Branch joins them three miles lower. The Middle Branch is the largest of these creeks, having its origin near High Point, about 12 miles east of Hot Springs. All of these branches are swift flowing perennial streams, and they receive in their courses accessions from many springs. The waters in many places dash over and amongst the rocks that beset their channels, forming miniature cascades and rapids, and at intervals they widen out into limpid pools or divide into several rivulets. Often the banks are steep and rocky and there is practically no valley, or again it widens out into flat but rocky flood plains, or in passing through sandy areas where seeping springs emerge, small bogs are formed, where a profusion of Sphagnum moss, ferns and sometimes Orchids and other hydrophytes flourish amongst thickets of characteristic shrubs and trees.

In studying the forests and plant associations the following ecological divisions may be recognized: the rocky uplands, rocky stream valleys, alluvial flood plains, sandy bogs, barrens and glades. Practically the entire area is wooded. And while the timber has been heavily culled to supply the numerous small saw mills, and some small areas have been cleared for agricultural purposes, these operations have not as yet been sufficiently extensive to seriously affect the character of the country or the composition of the flora. This is of course more particularly the case in the National Park, where the timber is being preserved and but little artificial planting has been done, but to a less extent it applies also to the general country beyond these boundaries. It is a safe estimate to say that more than 95 per cent of the surface is rocky, including all of the uplands and the greater part of the stream valleys. The only real alluvial bottoms are in the valley of the Ouachita River, even the largest of the swift flowing mountain streams not having yet developed this type of flood plain. There are no permanent swamps such as those so extensively developed in the valleys of the Mississippi, Arkansas and other large rivers of the region; and although traces of a prairie flora are found in some of the small glades, no real prairies occur here.

The forests are of the type characteristic of the southern part of the Ozark region: generally mixed stands of Pine and deciduous species, the

former sometimes predominating over small areas or developing pure stands, while trees and shrubs of the latter class form much the larger percentage of the flora, often to the exclusion of the Conifers. The trees are usually of a small or moderate size except in the stream valleys, although sometimes fine specimens of Oaks, Gums and Ash are found in favorable situations on the mountain sides. As the Ouachita Mountains constitute the last outpost of the mid-continent elevation and are flanked on the east and south by the lowlands of the Mississippi valley and the coastal plain, it is not surprising that a number of trees and shrubs, as well as herbaceous plants, characteristic of these provinces and not usually found in the uplands, have managed to invade the area and maintain themselves along the valleys of the creeks and rivers. More interesting, however, is the presence here of a number of species of the southern Appalachians, some of which extend far to the westward into the borders of Oklahoma, indicating a former connection between the mountain floras of these two regions, now effectively separated by the wide barrier of the river valley.

The rocky uplands, which may be loosely subdivided into comparatively level surfaces and steep mountain slopes, occupy by far the greatest part of the area. Short-leaf Pine and a few species of Hickories and Oaks constitute a great part of the larger timber over the more level portions. Characteristic species are *Pinus echinata*, *Carya alba*, *C. Buckleyi* var. *arkansana*, *Quercus alba*, *Q. stellata*, *Q. marilandica*, and less frequently, extending from the valleys, *Juglans nigra*, *Quercus rubra*, *Ulmus alata*, *Liquidambar Styraciflua* and *Nyssa sylvatica*. Amongst smaller trees and shrubs are *Prunus lanata*, *P. mexicana*, *Cornus florida*, *Bumelia languinosa* *Ceanothus americanus*, *Vaccinium arboreum*, *V. vacillans* and *V. stamineum*, although some of these are also common in the rocky valleys. The character of the steep mountain slopes and of their flora depends somewhat upon the pitch of the strata and their orientation. On the side corresponding to the dip, the surface, except where broken by ravines, may be comparatively regular and, if this faces approximately west or south, the flora described above may extend nearly to the summit, sometimes with the addition of such species as *Ostrya virginiana*, *Celtis pumila* var. *georgiana*, *Robinia pseudoacacia*, *Prunus serotina* and *Rosa subserrulata*. On the opposite side of the mountain ridge, where the crest of the upturned strata terminates in a hanging wall, much more rugged conditions generally prevail: large detached masses of rock and low cliffs stand out, and there are great accumulations of rubble in places. This is not without effect upon the flora, offering a variety of conditions as to light, soil and moisture, especially if the exposure is towards the north or east. An excellent example of this may be seen along the north side of West Mountain, both within and beyond the boundaries of the National Park, where the flora is exceptionally rich in both woody and herbaceous plants. *Castanea ozarkensis*, *Quercus borealis* var. *maxima*, *Ilex caroliniana*, *Tilia floridana*, *Vitis cordifolia*,

Lonicera flava, and more rarely *Staphylea trifolia* and *Aralia spinosa* are characteristic trees and shrubs in such places. Amongst herbaceous plants there are a variety of ferns, including such rupestral sorts as *Dryopteris marginalis*, *Cheilanthes lanosa*, *C. tomentosa*, *Asplenium parvulum* and *A. Trichomanes*, and the more shade loving *Adiantum pedatum*, *Polystichum acrostichoides* and *Athyrium angustum*. *Trillium recurvatum*, *Asarum canadense*, *Arisaema triphyllum*, *Caulophyllum thalictroides* and many other shade and moisture loving plants are found in rich coves; and in more open situations beds of the beautiful Bird-foot Violet, Larkspur and Indian Pink occur, followed later in the season by Blazing Star, False Foxglove and many species of Asters, Solidagos and Legumes.

Most of the trees of the uplands, as has been stated, descend into the rocky creek valleys. And there too are found such species as *Pinus Taeda*, *Salix nigra*, *Carpinus caroliniana*, *Carya cordiformis*, *Quercus Phellos* and more rarely *Q. nigra* and *Q. Muhlenbergii*, *Ulmus americana*, *Celtis laevigata*, *Morus rubra*, *Platanus occidentalis*, *Gleditsia triacanthos*, *Acer rubrum* var. *tridens*, *Diospyros virginiana* and *Fraxinus pennsylvanica* var. *lanceolata*. Many smaller trees and shrubs are also growing in this type of forest, and in the more open places these often predominate and develop something like thickets, which, however, are never very extensive, although they have probably increased in recent years as a result of clearings and forest thinning. Various species of *Crataegus*, *Prunus americana*, *Rubus Andrewsianus*, *Rosa setigera* var. *tomentosa*, *Rhus copallina*, *R. glabra*, *R. Toxicodendron*, *Ilex decidua* and *Sassafras officinale* form a large part of this smaller growth; *Cornus racemosa*, *Amorpha fruticosa*, *Evonymus americanus* and *Alnus rugosa* often grow in wet springy ground. Along the immediate margins of the streams, and on the rocky shingle brought down in times of flood, there are several characteristic woody species: *Alnus rugosa* is commoner here than in the last named situation, and *Salix longipes* var. *Wardii*, *Hamamelis vernalis*, *Amorpha nitens* and *Cephalanthus occidentalis* are usually confined to this narrow zone. Several introduced trees and shrubs have appeared in the upper part of the valley of Hot Springs Creek and along several of the smaller streams in the vicinity of the town: *Morus alba*, *Maclura pomifera*, *Catalpa speciosa*, *C. bignonioides*, *Melia Azedarach*, *Paulownia tomentosa* and *Lonicera japonica* were found here, and some of them are becoming abundant. Introduced weeds are also abundant in association with the adventive woody species, but for the most part the native flora has not been much altered and in the more remote parts of the valleys it remains in a primitive condition. Most of the native herbaceous plants found here extend also into the rocky woods or other ecological environments. *Phlox pilosa*, *Pentstemon arkansanus*, *Monarda Bradburiana*, *Salvia azurea* and *Agalinis tenuifolia* are often abundant, and showy in flowering season; *Amsonia ciliata*, growing in large frutescent clumps, is conspicuous on gravel bars; and *Iris cristata*, *Sanguinaria canadensis* and *Dodecatheon Meadia* along moist rocky banks bordering the

valley. The pretty yellow flowered Honeysuckle, *Lonicera flava*, and the handsome flowering shrub, *Styrax grandifolia*, flourish in places along the low rocky bluffs. Towards the heads of the mountain streams the *Styrax* is even more abundant, descending into the narrow rocky valleys in association with *Amorpha glabra*, *Hamamelis macrophylla* and *Viburnum prunifolium*. Here, too, on the steep rocky slopes are sometimes found patches of the beautiful Azaleas, *Rhododendron roseum* and *R. canescens*, and in a few places the southern Sugar Maple, *Acer leucoderme*, usually only a shrub, although where it descends into the protected valleys it becomes a small tree.

Along the upper courses of these mountain streams occur the little sandy bogs, always very local, resulting from perennial springs issuing in sandy or rich humus laden soil. In spite of their small extent the flora of these little bogs is usually quite distinct and interesting, being composed largely of species of the coastal plain, which have managed to take possession of these favored spots. Red Maple, Sweet Gum and a few other trees may be present, but shrubs form the bulk of the woody flora. *Alnus rugosa* is very common here, with Spice Bush (*Benzoin aestivale*), *Itea virginica*, *Ilex opaca*, *Viburnum nudum* and sometimes *Rhododendron oblongifolium* and *Myrica cerifera*. The herbaceous flora is often very rich; growing amongst the Sphagnum moss are many ferns, orchids and other moisture loving plants, including *Osmunda regalis*, *O. cinnamomea*, *Woodwardia virginica*, *W. areolata*, *Onoclea sensibilis*, *Isoëtes melanocarpa*, *Habenaria dilatata*, *Pogonia verticillata*, *Chamaelirium luteum*, *Lobelia puberula*, *Bartonia virginica*, *Viola blanda* and many others.

The alluvial bottoms of the Ouachita, originally heavily wooded, have been largely cleared for agricultural use. The remnants of this forest that remain contribute a few species not found elsewhere or at least not commonly. *Betula nigra* and *Acer saccharinum* are typical riparian trees and *Populus balsamifera* var. *virginiana*, *Celtis laevigata*, *Acer Negundo* var. *texanum*, *Fraxinus pennsylvanica* var. *lanceolata*, *Cornus stricta* and the woody vines, *Calycocarpum Lyoni*, *Brunnichia cirrhosa* and *Bignonia capreolata* are typical species of the lowland forest.

More interesting is the peculiar assemblage of plants that has taken possession of the rocky banks and shingle bars and islands of the flood plains along the riffles and rapids of the river, near the mouth of Hot Springs Creek. A shale bed outcrops in the bed of the river near this point, and the bluffs above are composed of sandstone, quartzite and other hard siliceous strata, the detritus from which has been washed down by the river to form or cover the extensive bars and islands that beset its channel for some distance below. Both the shale outcrop and these shingle-covered bars are submerged in every freshet, but at ordinary stages of the river become dry and sun scorched. Besides the woody plants usual in such situations, several distinctly swamp species and others of rather xerophytic character are found here: *Carya aquatica*, *Planera*

aquatica and *Styrax americana* look strange in such an environment but all of them appear to flourish. *Salix longipes* var. *Wardi*, *Platanus occidentalis* and *Hypericum prolificum* are very abundant, and growing with them on the gravel bars are *Salix nigra*, *Platanus occidentalis*, *Liquidambar Styraciflua*, *Ilex decidua* and the woody vines: *Vitis palmata*, *V. rupestris*, *Wistaria macrostachya* and *Bignonia capreolata*. On the shale outcrop are found *Polygonella americana*, *Andrachne phyllanthoides*, *Amorpha glabra*, *A. fruticosa*, *A. croceo-lanata*, *Hypericum prolificum* and *A. cistifolium*. Conspicuous perennials are *Amsonia ciliata*, *Grindelia lanceolata*, *Vernonia Lettermani* and *Coreopsis lanceolata* var. *villosa*. On the rocky banks just above the shale bed *Ilex vomitoria* is growing, and on the opposite or north-facing bluff, *Philadelphus pubescens*, *Ulmus serotina* and *Halesia monticola* var. *vestita*. On exposed rocky ledges here was also found the pretty purple flowered Crucifer, *Streptanthus maculatus*, found and described by Nuttall from a similar place along the Arkansas River.

The rocky barrens and glades of the Hot Springs area are of very limited extent. Most of them occur where the small streams have exposed beds of shale or other rocks, or along naked ledges and outcrops of silicious rocks on the mountains. The typical flora is largely herbaceous, but includes such slender shrubs and barely woody plants as *Opuntia humifusa*, *Hypericum cistifolium* and *Rosa subserrulata*. Amongst characteristic herbaceous species are *Cheilanthes lanosa*, *Talinum calycinum*, *Tragia ramosa*, *T. macrocarpa*, *Polygonum tenue*, *Asclepiodora viridis*, *Onosmodium occidentale*, *Trichostema dichotoma*, *Grindelia lanceolata* and *Aster oblongifolius*, to mention only a few of the more common ones. In the absence of any distinctive woody flora various small trees and shrubs of somewhat xerophytic habit have invaded the barrens: *Celtis pumila* var. *georgiana*, *Crataegus apiifolia*, *C. thermopegaea*, *Vaccinium arboreum*, *Diospyros virginiana*, *Bumelia lanuginosa* and stunted specimens of *Ulmus alata* and *Quercus marilandica* are amongst those most frequently present.

The dominant type of forest and its included herbaceous flora in the Hot Springs area may then be regarded as typical of the Western phase of the Carolinian flora, which has extended over the Ozark region from the south, succeeding the prairie and steppe conditions that followed the last retreat of the glaciers, of which such abundant evidence still remains in the prairies and barrens of the Ozark plateau. A few species of southwestern origin have found their way here, as to other parts of the region: Amongst them may be enumerated *Prunus mexicana*, *P. Rererchoni*, *Andrachne phyllanthoides*, *Yucca glauca*, *Celtis laevigata* var. *texana*, *Vitis Linsecomi* var. *glauca* and *Cissus incisa*. Some of these are perhaps rather southern than southwestern, but a number of others amongst herbaceous species undoubtedly have their center of distribution in the latter quarter.

At least 30 species on the appended list, or 15 per cent of the total, belong to the Coastal Plain province and the southern or humid phase

of the Carolinian flora, although a few of them extend far north along the Atlantic seaboard and inland to the shores of the old Mississippi embayment. Most conspicuous amongst these are *Pinus Taeda*, *Myrica cerifera*, *Smilax lancifolia*, *Quercus nigra*, *Planera aquatica*, *Hamamelis macrophylla*, *Crataegus spathulata*, *C. apiifolia*, *Rubus rubrisetus*, *Xanthoxylum Clava-Herculis*, *Ilex opaca*, *I. vomitoria*, *Acer leucoderme*, *Aesculus discolor* var. *mollis*, *Vitis rotundifolia*, *Aralia spinosa*, *Rhododendron oblongifolium*, *Xolisma mariana*, *Vaccinium corymbosum*, *V. virgatum*, *Bignonia capreolata* and *Viburnum nudum*. While some of the herbaceous plants found in the area are also from this source they are probably relatively less abundant. In view of the geographical position of the Ouachita Mountains, their presence here is not at all surprising, as has been previously mentioned.

Perhaps the most interesting feature of the ligneous flora is the occurrence of a number of plants, which, judging by their present distribution, appear to have originated in and been dispersed from the Southern Appalachian region of the Southeastern States. Most of these are by no means confined to the Hot Springs area, but are in many cases found both farther north, in the Boston Mountains, and westward to the Kaimichi Mountains of Oklahoma. They are, however, in most cases, comparatively rare or local in this region, and some of them are found only in certain localities affording the protection of high north-facing bluffs or other exceptionally favorable conditions. To this class belong *Magnolia tripetala*, *Philadelphus pubescens*, *Crataegus straminea*, *C. regalis*, *C. Mohri*, *Robinia Pseudoacacia*, *Amorpha nitens*. *Ilex caroliniana*, *Styrax grandifolia*, *Halesia monticola* var. *vestita* and *Rhododendron canescens*.

The Mississippi River, with its wide flood plains and extensive areas of lowlands and swamp, completely occupied as they are by a dense flora of a different character, offers at present such an effective barrier between the two regions as to preclude any probability of direct migration of mountain species between them, and when we consider the antiquity of this barrier, the probability becomes even more remote. How then are we to account for the presence here of these woody plants, as well as many herbaceous species, from the Appalachian region? The most plausible hypothesis seems to be that preceding the last incursion of the glaciers, perhaps during an interglacial period, this flora extended westward along the highlands to the north of the Mississippi embayment, and that some of its plants were pushed southward, on both sides of the present valley.

PINACEAE

Pinus echinata Mill. The Short-leaf or Yellow Pine is still one of the commoner forest trees on some parts of the area, growing on rocky uplands and mountain slopes. Formerly, it was much more abundant and furnished large quantities of logs to the numerous saw mills that operated in Hot Springs and vicinity. Some good specimens are still to be seen in the National Park, where fortunately they will be preserved.

Pinus Taeda L. The Old-field Pine, sometimes called Long-leaf Pine

in this section, is a species of the Coastal Plain, which has invaded the Hot Springs area along the stream valleys. It is not rare but much less common than the last.

Juniperus virginiana L. The Red Cedar is found in many places along rocky streams and mountain sides, but is nowhere very common or of large size.

GRAMINEAE

Arundinaria macrosperma Michx. The Small Cane is found along the Ouachita River valley and in the protection of bluffs along the smaller streams. It seldom attains here a height of more than one or one and a half meters.

LILIACEAE

Yucca glauca Nutt. This scarcely woody Yucca, sometimes called Bear Grass, attains a maximum height of about one meter. It was found in several places along the rocky bluffs of the Ouachita River.

Smilax glauca Walt. The various species of Smilax are popularly called Green-briar, Saw-briar or Cat-briar, and are scarcely distinguished by the country people, although well marked in botanical characters. This slender trailing or climbing species is common in open rocky or alluvial ground along streams.

Smilax hispida Muhl. A high climbing vine in moist or alluvial ground along streams. The larger stems are thickly set with prickles.

Smilax Bona-nox L. This species, with stout short thorns, grows usually in dry rocky or gravelly open ground along streams.

Smilax rotundifolia L. In moist fertile ground, climbing on trees and shrubs.

Smilax lanceifolia L. This species was collected in the valley of the Ouachita River. It may be looked for also in small sandy bogs along the mountain creeks.

SALICACEAE

Populus balsamifera var. *virginiana* (Foug.) Sarg. The Cottonwood is found in the Ouachita River valley and occasionally along some of the smaller streams.

Salix nigra Marsh. The Black Willow is found along all of the perennial streams, but is commonest in the valley of the Ouachita River. Some tall specimens here and on Hot Springs Creek may represent the var. *altissima* Sarg.

Salix longipes var. *Wardii* (Bebb) Schneider. The Gray or Ward's Willow is a common and characteristic shrub or small tree along the rocky or gravelly margins of the larger streams. It is particularly abundant on the rocky flood plains and banks of the Ouachita River, near the mouth of Hot Springs Creek.

Salix humilis Marsh. This low shrubby Willow, which is characteristic of more open regions, appears to be rather rare here, having been noted only near High Point and at one other place.

MYRICACEAE

Myrica cerifera L. The Wax Myrtle, a southern shrub of the coastal Plain, is growing here in small sandy bogs along the upper courses of several of the spring-fed tributaries of Gulpha Creek. A few specimens were also seen near the mouth of Hot Springs Creek.

JUGLANDACEAE

Juglans nigra L. Black Walnut. Found sparingly in the valley of the Ouachita River and along the larger creeks.

Carya ovata (Mill.) K. Koch. The Shag-bark Hickory is rare in the Hot Springs area, apparently being confined to the valley of the Ouachita River, where a few specimens were seen.

Carya alba (L.) K. Koch. Mocker-nut, Bull Hickory. This is a rather common tree in dry upland woods and also in the rocky creek valleys. The nuts are gathered by the country people and are sometimes sold on the market. They are very variable in shape and size.

Carya Buckleyi var. *arkansana* Sarg. This southwestern species grows in similar situations to the last, and is more abundant, being the commonest Hickory of the region. Like the other species, the wood is much sought for tool handles, wagon material and other uses.

Carya Buckleyi var. *villosa* (Ashe) Sarg. This form, with pubescent leaves and young branchlets, is sometimes found on dry rocky ridges and mountain slopes.

Carya ovalis var. *oboralis* Sarg. This is also a species of dry rocky ground. It apparently is not common here, its principal range being to the north and east.

Carya leiodermis Sarg. This southern Hickory has recently been found in the Hot Springs area, and at several other stations in southern Arkansas.

Carya cordiformis (Wangh.) K. Koch. This tree is known throughout the South and Middle-west as Pignut, on account of the bitter inedible nuts, which, however, are eaten by swine and wild animals.

Carya aquatica (Michx. f.) Nutt. The Swamp Hickory, as its name indicates, is usually a denizen of deep swamps or wet alluvial bottoms, but along the Ouachita River, it has, with several other swamp species, adapted itself to a very unusual environment, growing on the low rocky banks and on bars and islands covered with coarse shingle and rubble, which are often flooded by rises of the stream.

BETULACEAE

Betula nigra L. The River Birch was seen only along the banks of the Ouachita River.

Carpinus caroliniana Walt. Ironwood, Blue Beech. This small tree is common in places in the rocky flood plains of the larger creeks and along the Ouachita River.

Ostrya virginiana (Mill.) Willd. Ironwood, Hop-hornbeam. This species often grows with the last but it is also sometimes found in dryer situations and on the mountain sides.

Alnus rugosa (Du Roi) K. Koch. This shrubby Alder has a wide range, extending from New England to Minnesota and along the coastal plain to Eastern Texas. In the Hot Springs area it is found frequently along the margins of rocky streams.

Corylus americana Walt. The Hazelnut is a northern shrub, and reaches almost its southwestern limit of range here. It is found in thickets along some of the streams, but is rather rare.

FAGACEAE

Castanea ozarkensis Ashe. Ozark Chinquapin. This species, which is often arborescent, is rather common on the high rocky slopes of some of the mountains.

Quercus alba L. The White Oak is a common and characteristic tree of the upland woods, and it also grows along streams where the soil is well drained. It usually attains only a moderate size here, and as it is one of the most valuable hardwood timber trees, most of the larger specimens, outside of the National Park, have been cut down to supply the saw mills.

Quercus alba var. *latiloba* Sarg. This variety, with broad-lobed leaves is about as common as the typical form.

Quercus stellata Wangh. The Post Oak is a very common medium-sized tree of the rocky upland woods. The wood is used for fuel and railroad ties.

Quercus stellata var. *araneosa* Sarg. A group of small trees of this well marked variety was found on a rocky hillside near the Ouachita River, and it probably occurs elsewhere.

Quercus Muhlenbergii Engelm. Chinquapin Oak, Yellow Oak. This tree shows a decided preference for limestone regions and alkaline or neutral soils, and it is comparatively rare in the Hot Springs area. A few specimens were noted in the rocky valley of Gulpha Creek and also about half-way down the valley of Hot Springs Creek.

Quercus borealis var. *maxima* Ashe. The Northern Red Oak is found on rocky slopes and is abundant on some of the mountain sides, especially near the summits.

Quercus Shumardii var. *Schneckii* (Britton) Sarg. Red Oak. This species is scarcely distinguished from the last by woodsmen and farmers. It is a common tree in most of the Ozark region, but appears to be rather rare here, only a few specimens having been found in the creek valleys.

Quercus velutina Lam. The Black Oak is a common tree throughout the area in rocky upland woods.

Quercus velutina var. *missouriensis* Sarg. This variety, with more pubescent and thicker leaves, is found on rocky mountain slopes.

Quercus marilandica Muench. The Black Jack Oak is found in the dryer and more sterile parts of the rocky woods, where it is often very common. It is a small sized tree and the wood is usually of inferior quality.

Quercus rubra L. Red Oak, Spotted Oak. This tree is common in the

rocky valleys and on the lower hills. The leaves are pale and tomentose and vary greatly in size and lobing.

Quercus Phellos L. This species, which usually grows on low alluvial lands, is comparatively scarce in the Hot Springs area. It is occasionally found, however, along all of the small streams and in the valley of the Ouachita River.

Quercus nigra L. The Water Oak, which is more commonly called Pin Oak in the South, is distinctly a lowland species, and it is one of the rarest Oaks in the Hot Springs area. Besides growing on alluvial lands along the Ouachita River, a few specimens were found in the upper part of the valley of Hot Springs Creek, where it has apparently hybridized with other species, as recorded below.

× **Quercus garlandensis,** hyb. nov. (*Q. nigra* × *rubra*). Three trees which appear to be this hybrid were found in the upper part of the valley of Hot Springs Creek. The first, following the course of the creek, is a slender symmetrical tree about 18 meters tall and with a trunk 4 decimeters in diameter. The bark is comparatively smooth, and somewhat mottled on the branches, resembling that of *Q. nigra;* the branches are slender, the lower one horizontal or slightly drooping; leaves variously lobed and often unsymmetrical, stellate pubescent on both sides when young, becoming glabrate in age except for prominent tufts of tomentum in the axils of the veins on lower surface; fruit sessile or nearly so, short ovoid, the nuts 12–14 mm. long and 10–12 mm. in diameter, pubescent at the apex, enclosed only at the base in the shallow cups, which are 12–15 mm. in diameter and 4–5 mm. in height, flattened, rounded or slightly turbinate at the base, and with rather loose slightly puberulent scales. The second tree is about 30 meters down the stream and close to its bank. It is slightly smaller but quite similar. The third is about 150 meters down the stream and on the opposite or left bank. It is a smaller tree, only about 10 meters in height. These trees have been under observation for three seasons and their identity has been quite puzzling; at one time I thought they might be referable to *Q. georgiana* Curtis, to which in foliage and fruit they are somewhat similar. The two larger trees have fruited abundantly, and an attempt is being made to grow them both from grafts and seeds at the Arnold Arboretum. *Quercus rubra* is rather common in the vicinity of these trees, and there is a large tree of *Q. nigra* about 100 meters up the stream from the first tree, and a few smaller specimens are found near. My specimens, numbers 23139 and 24238, from the first tree described, may be taken as typical.

Quercus nigra × *velutina?* A small tree, 6 or 7 meters tall and with a trunk diameter of about 2 decimeters, growing in a group of larger trees in the rocky valley of Hot Springs Creek, about one mile south of the National Park, appears to represent this hybrid. The fruit was not seen, and this somewhat doubtful determination is based on the characters of the leaves, buds and branchlets, which appear to be intermediate between the two

species indicated, both of which are growing nearby. There is no doubt that the tree is a hybrid, but better material is needed for definite determination.

Quercus Phellos × *velutina*. A single specimen of this hybrid was found in 1925 along a tributary of Gulpha Creek, about a mile east of the city of Hot Springs. The tree is about 15 m. tall and was fruiting abundantly. Both supposed parent species are growing close by.

× **Quercus incomita,** hyb. nov. (*Q. marilandica* × *rubra*). A single tree believed to be a hybrid between the Black Jack and Southern Red Oak was found at the edge of the rocky valley of a small tributary of Gulpha Creek, about a mile and a half east of Hot Springs. The tree is about 12–14 m. tall, with stout branches and branchlets. The bark is moderately rough and furrowed, resembling that of *Q. rubra*. Leaves obovate in outline, narrowed and rounded or subcordate at base, with shallow sinuses and one to three pairs of ascending, bristle-tipped lobes; texture firm and slightly stellate-pubescent beneath. Fruit short-stalked; nut oblong or short-cylindric, 14–16 mm. long, 8–12 mm. in diameter, one-third to one-half enclosed in the rounded or turbinate cup, which is about 10 mm. deep and 12–15 mm. in diameter, with rather loose puberulent scales and thin fringed margin. In leaf form and habit of growth this tree resembles more closely forms of *Q. rubra*, while in the fruit characters and its stout branchlets and large pubescent buds the resemblance is closer to *Q. marilandica*. Both supposed parent species are growing in close proximity to it.

ULMACEAE

Ulmus americana L. The White or American Elm grows in open woods along all of the streams, but it is nowhere very common.

Ulmus fulva Michx. The Slippery Elm is apparently rare, one large tree only having been noted in the valley of Hot Springs Creek. This tree had been much injured by the repeated stripping of the bark, presumably by natives for medicinal purposes. No doubt it occurs sparingly at other places in the area.

Ulmus alata Michx. The Winged Elm is the common Elm of the region, and is often abundant along streams and in rocky hillside woods.

Ulmus serotina Sarg. The Southern Red Elm, which is distinguished from the other species by its habit of flowering and fruiting in the autumn, is rather abundant along the rocky bluffs of the Ouachita River, and it was also found on the banks of Gulpha Creek.

Planera aquatica (Walt.) J. F. Gmel. The Planer-tree or Water Elm, like the Swamp Hickory, is normally found in deep swamps, but with that tree it has managed to establish itself along the rocky ledges and bars of the Ouachita River, where it appears to flourish, rooting directly in the shale beds or quartzite rubble, the roots doubtless penetrating to a permanent water supply in the bed of the river as well as being irrigated by frequent floods that sometimes sweep quite over the tops of the trees.

Celtis laevigata Willd. This southern Hackberry is found along streams, and is most abundant in the valley of the Ouachita River.

Celtis laevigata var. *texana* (Scheele) Sarg. This southwestern variety grows in the rocky valleys in somewhat drier situations than the last.

Celtis pumila var. *georgiana* (Small) Sarg. This species is usually a shrub or sometimes a small crooked-branched tree growing in the rocky valleys or on the mountain sides.

MORACEAE

Morus rubra L. The Red Mulberry is found occasionally on the more fertile lands along the streams. It is a small-sized tree here and nowhere very common.

Morus alba L., the White Mulberry of the Old World, has become established in waste ground and along streams, probably from seeds carried by birds from cultivated trees.

Ficus Carrica L., the domestic Fig, was also collected as an escape from cultivation, along Hot Springs Creek.

Maclura pomifera (Raf.) Schneider. Osage Orange, Hedge Tree. This tree, which is probably an escape from cultivation here, but which is native in the prairie regions a little to the west, was found growing at several places near Hot Springs.

POLYGONACEAE

Polygonella americana (Fisch. & Mey.) Small. This curious little shrub is locally abundant on shale outcrops in the flood plain of the Ouachita River, near the mouth of Hot Springs Creek. It is distinctly woody, some of the stems being nearly 2 centimeters in diameter, and the maximum height of the plants is about 6 decimeters. I have not been able to learn any local name for this plant. The name Jointweed, given in the books, is not in use here, and is certainly inappropriate, as few plants could with less justice be called weeds.

Brunnichia cirrhosa Banks. This slightly woody climbing vine is a lowland species, and was noticed only in the lower part of the valley of Hot Springs Creek and along the Ouachita River.

LORANTHACEAE

Phoradendron flavescens (Pursh) Nutt. Mistletoe. This well known parasitic shrub is found in the valley of the Ouachita and occasionally along the smaller streams. Its commonest hosts here are the Elms, but it is sometimes found on various other trees.

RANUNCULACEAE

Clematis Simsii Sweet. Leather-flower. This slightly woody climber is found in thickets in the valleys and on open rocky hillsides.

Clematis versicolor Small. This species is similar to the last, differing from it mainly in the plumose styles which tip the seeds. It has been found in sandy soil along the Ouachita River.

ANONACEAE

Asimina triloba (L.) Dunal. The Papaw is found on the more fertile lands in the stream valleys, but it is not very abundant.

MAGNOLIACEAE

Magnolia tripetala L. Umbrella-tree. Perhaps this tree should not be included in the list, as it was not seen strictly within the limits of the general exploration, but it was collected a few miles to the south, in the southern part of Garland County, and it also occurs a few miles north of Hot Springs, if not actually within the area.

MENISPERMACEAE

Menispermum canadense L. Moonseed. This slender woody vine grows in thickets along the creeks and river.

Cocculus carolinus (L.) DC. Fishberry. A trailing or climbing vine, found in thickets along streams and on open rocky hillsides.

Calycocarpum Lyoni (Pursh) Nutt. Cupseed. This barely woody climber was collected in open alluvial ground in the valley of the Ouachita River.

LAURACEAE

Sassafras officinale Nees & Eberm. The Sassafras is found in open rocky ground along streams and is most frequent in rocky abandoned fields.

Benzoin aestivale (L.) Nees. Spice-bush. This shrub is found in moist rich soil along all of the perennial streams. A form with pubescent leaves and branchlets, which is frequent throughout the Ozark region and in several Southern States, is also found here.

SAXIFRAGACEAE

Hydrangea arborescens L. This low shrubby species grows on steep rocky slopes and bluffs with a north or east exposure, where there is rather abundant moisture.

Philadelphus pubescens Loisl. Mock-orange, Syringa. This pretty flowering shrub is growing along the rocky north-facing bluffs of the Ouachita River, and it was also collected along Gulpha Creek, about 4 miles east of Hot Springs.

Itea virginica L. This little shrub is usually found in deep swamps, but in the Hot Springs area it grows amongst wet rocks in spring creeks and in the small sandy bogs.

HAMAMELIDACEAE

Hamamelis macrophylla Pursh. Witch Hazel. This species is similar to *H. virginiana* of the eastern and northern states, but is generally a smaller shrub and never arborescent. It flowers from September to November. It is found along streams and mountain sides.

Hamamelis vernalis Sarg. This is a stout shrub growing in clumps along the gravel bars and rocky margins of all the perennial streams. It flowers in February and March.

Liquidambar Styraciflua L. The Sweet Gum is a common tree of large size in the valleys of all of the streams, and is sometimes found on the lower north slopes of the mountains

PLATANACEAE

Platanus occidentalis L. Sycamore. This well known tree is found along the banks of the river and on several of the larger creeks.

ROSACEAE

Amelanchier canadensis (L.) Medic. June-berry. On rocky bluffs and north slopes of the mountains.

CRATAEGUS

CRUS-GALLI GROUP

Crataegus bellica Sarg. Red Haw, Cock-spur Thorn. The name Red Haw, or more rarely Thorn Tree or Thorn Bush, is popularly applied in this part of the country to the various members of this genus, some of which are very distinct from each other in habit, foliage, flowers and fruit, while others are distinguished on only slight botanical differences. This species is a very thorny, intricately branched shrub or small tree, growing in thickets in the rocky valleys.

Crataegus Bushii Sarg. A small tree found in situations similar to the last.

Crataegus Mohrii Beadle. This species ranges from the southern Appalachians to Arkansas, and probably reaches its northwestern limit here.

Crataegus regalis Beadle. This is also a species of the southern States, which apparently is not very common here.

Crataegus Engelmannii Sarg. This and the two following species are somewhat similar to each other and may be distinguished from others of the group found in this area, by having pubescent leaves and flowering corymbs. Like most of the Red Haws it grows in thickets and open woods in the rocky valleys.

Crataegus pilifera Sarg.

Crataegus subpilosa Sarg.

PUNCTATAE GROUP

Crataegus sordida var. *villosa* Sarg. A small tree with spreading branches and round or flat top. It differs from most of the others also in being almost thornless. It is comparatively rare here.

VIRIDES GROUP

Crataegus viridis L. Green Haw, Bird Haw. This is a small tree, but becoming larger than most of the other species The bark is flaky in thin scales, and the abundant fruit is of small size. It is widely distributed in the southern states, and usually inhabits wet alluvial bottom lands. It is rather abundant in the Hot Springs area, growing in the more fertile parts of the valleys.

Crataegus blanda Sarg. This species differs from the last mainly in its rougher dark bark. It grows often in dryer situations.

UNIFLORAE GROUP

Crataegus trianthophora Sarg. This little shrub, seldom more than 5 to 6 decimeters in height, was seen only on the rocky banks of the Ouachita River, near Lawrence.

PRUINOSAE GROUP

Crataegus seclusa Sarg. A very thorny shrub or small tree, found in thickets and openings in rocky woods. The fruit is hard and remains green until late in the season.

INTRICATAE GROUP

Crataegus Harveyana Sarg. This is a very thorny intricately branched shrub, 1 to 2 meters in height. It is found in thickets on rocky hillsides and along the small streams.

Crataegus straminea Beadle. A shrub similar to the last, but distinguished by its thinner, nearly glabrous leaves and its flowering. It is more abundant than the last and often grows in large patches.

Crataegus padifolia var. *incarnata* Sarg. This Thorn sometimes becomes a small tree, but is more often shrubby, as were the specimens seen here.

Crataegus ouachitensis, sp. nov.[1] Growing rather sparingly in thickets along the rocky creek valleys and on open hillsides, about Hot Springs.

Shrub or small tree 4–6 m. tall, with slender ascending branches and dark gray bark, smooth on the branches and becoming scaly on old trunks; abundantly armed with moderately stout dark purplish straight or slightly curved spines 2–4 cm. long; branchlets glabrous, at first olive-brown, becoming gray. Leaves ovate or deltoid in outline, 2–4 cm. long and about as wide, sharply and deeply serrate with narrow acuminate teeth, and with one to three pairs of usually obscure lobes, acute or abruptly pointed at the apex, rounded or abruptly contracted at the base, tapering into the very slender 1.5–2.5 cm. long petioles; glabrous at flowering time or with a few villous hairs on the upper surface and on the petioles; those on vigorous shoots sometimes larger, truncate or subcordate at base and more deeply lobed. Flowers 1.5–2 cm. in diameter, in few-flowered (3–8 in specimens examined) corymbs; pedicels slender, 1–2 cm. long; calyx-lobes lanceolate, serrate or laciniate; stamens about 20; anthers rose color or rose-purple; styles 3–4. Fruit on specimens examined obovoid or pyriform, 7–10 mm. long, 7–8 mm. thick, remaining hard and green until late in the season, and finally flushed with red; calyx broad and prominent, with short tube and persistent lobes; nutlets 3–4, with shallow grooves and broad ridges on the dorsal surface, flattened or slightly concave ventrally, and with distinct hypostyle.

This species is perhaps most closely related to *Crataegus seclusa* Sarg.

[1] **Crataegus ouachitensis,** sp. nov. Frutex vel arbor minor, circa 4–6 m. altus; rami erecti vel ascendentes; ramuli annotini fusco-virides, biennes cinerascentes; cortex sulcato-squamosus; spinae satis robustae, atropurpureae. Folia ovata vel deltoidea, 2–4 cm. longa, circiter 2–4 cm. lata, obscurae lobata, margine graciliter inciso-serrata, apice breviter acuta, basi rotundata vel subito in petiolum gracillimum 1.5–2.5 cm. longum contracta; juvenilia glabrescentia vel leviter villosa; ramulorum sterilium majora, ad 3–4 cm. longa lataque, profunde incisa, basi truncata vel subcordata. Flores 1.5–2 cm. lati, pauci (in speciminibus visis 3–8), in corymbis glabrescentibus vel leviter pilosis; pedicelli graciles 1–2 cm. longi; stamina circa 20; antherae roseae vel roseo-purpureae; styli 3–4. Fructus obovato-oblongus vel pyriformis, circa 7–10 longus, 7–8 mm. crassus, firmus, viridis, deinde rubescens; calyx latus, tubo brevi; sepala lanceolata, serrata.

from which it differs in its small, sometimes slightly villous leaves, which are more deeply serrate, and especially in the size and shape of the fruit and nutlets. The fruit most closely resembles that of *C. vicinalis* Beadle in its shape and size, but differs from it in color and in its dryer and harder flesh; the foliage is also quite different from that species.

Type specimens are my numbers 24477, April 22, 1924, for flowers and 26459, Oct. 9, 1924, for fruit, both from the same plant. Number 29083, Oct. 10, 1925, from another tree, also belongs to this species.

Crataegus ouachitensis var. **minor,** var. nov.[1] This variety differs from the type in its smaller, relatively shorter leaves, which are sometimes broader than long, varying from short-ovate to broadly rhombic or elliptic in outline, less lobed, more deeply and finely serrate, and more copiously pubescent on the veins and on the extremely slender (2.5–3.5 cm. long) petioles, in the villous flowering corymbs and subglobose or slightly oblong fruit.

In appearance and habit this plant is so distinct and striking that when first found in flower I was inclined to regard it as a hybrid between *C. apiifolia* and the above species, a suspicion, however, that was not confirmed by the mature fruit. Although differing considerably in appearance it seems clearly to be related to *C. ouachitensis*, and is perhaps best regarded as a variety of that species.

Type specimens are my numbers 24499, April 23, 1924, for flowers, and 29095, Oct. 10, 1925, for fruit, both coming from the same plant. Number 26848, April 21, 1925, is also from this shrub, and number 29177, Oct. 13, 1925, from a small specimen at a different locality, also belongs here. The specimens seen were spiny shrubs 2–3.5 m. tall, growing on rocky banks along a branch of Gulpha Creek.

MICROCARPAE GROUP

Crataegus spathulata Michx. This very distinct southern species is rather common in the Hot Springs area, growing in rocky valleys and sometimes on the mountain slopes. Like the other members of the group it has small bright red fruit, usually very abundant and showy.

Crataegus apiifolia (Marsh.) Michx. Parsley Haw. This species resembles the last in habit and in its thin flaky bark, but is well distinguished by its small round or ovate, deeply incised leaves and its much earlier flowering.

MACRACANTHAE GROUP

Crataegus thermopegaea, sp. nov. An[2] intricately branched very spiny

[1] **Crataegus ouachitensis** var. **minor,** var. nov. A typo recedit habitu minore dense ramoso, foliis minoribus, saepe brevioribus quam longis, magis inciso-serratis, copiose pubescentibus, corymbis pilosis et fructibus oblongis vel subglobosis.

[2] **Crataegus thermopegaea,** sp. nov. Frutex dense ramosus ad 1–1.5 m. altus, spinis crebris gracilibus 2–4 cm. longis. Folia matura papyracea sed firma, ovata, obsolete lobata, 2.5–4 cm. longa, 2–4 cm. lata, margine serrata vel biserrata dentibus parvis acuminatis, apice acuta vel breviter acuminata, basi cuneata, sensim in petiolum 1–2 cm. longum contracta, superne adpresse-villosa, subtus hirsuta praesertim ad venas; ramulorum sterilium ad 5–6 cm. longa, basi rotunda vel truncata. Flores pauci, in

shrub, 1–1.5 m. tall, growing in thickets on rocky banks and along small upland streams in the vicinity of Hot Springs.

Leaves ovate in outline, obscurely lobed and sharply serrate with broad acuminate teeth, acute or slightly acuminate at the apex, appressed-villous above and hirsute on the lower surface with short pale hairs, thin but firm at maturity, 2.5–4 cm. long, 2–3 cm. broad, or larger on vigorous shoots, where the base is also sometimes truncate or subcordate. Flowers opening very late in the season (seen only in bud April 21st), in few-flowered compact densely villous corymbs, with glandular deciduous bracts and serrate calyx lobes; stamens 10? or more; anthers deep red in bud. Fruit subglobose, 6 10 mm. in diameter, with small nearly sessile calyx and erect or spreading calyx-lobes, which are usually deciduous from the ripe fruit, bright scarlet, with yellow flesh, becoming succulent when mature; nutlets 2 3, broad and rounded at the ends, broadly ridged on the dorsal and shallowly pitted on the ventral surface.

This species differs strikingly in habit and general appearance from any other member of the group with which I am acquainted, resembling more some of the Intricatae, to which group I was inclined to assign it before examining the ripe fruit and nutlets.

Type specimens are my numbers 26845 (in bud), April 21, 1925, and 29085, October 10, 1925, with mature fruit. Other collections are numbers 26703 and 26704, October 11, 1924. A specimen collected in flower by J. H. Kellogg, number 19, Baker Springs, Howard Co., Ark., April 20, 1909, may also belong here. The stamens of this plant as recorded on the specimen are 20; anthers rose-color; styles 2 3.

Rubus Andrewsianus Blanchard. This is the common tall Blackberry of the region. It is found here in thickets and clearings, but is not so common as in more open sections.

Rubus villosus Ait. This thorny Dewberry is found on rocky mountain slopes and in open ground along the creek valleys.

Rubus rubrisetus Rydb. A southern species found in sandy ground along the Ouachita River and on railway embankments near Hot Springs. The fruit ripens earlier than that of the other species. The stems are thickly covered with red bristles.

Another species of Blackberry, which may be *Rubus probabilis*, Bailey, was found in open rocky ground along Gulpha Creek, but the material is not complete enough for definite determination.

Rubus thyrsoideus Wimmer, a European species, sometimes cultivated, was collected as an escape along Hot Springs Creek.

Rosa setigera var. *tomentosa* T. & G. Prairie Rose. This tall somewhat climbing species is found in thickets along the stream valleys.

Rosa subserrulata Rydb. This low growing species, with very spiny

corymbis dense villosis compactis; stamina 10 vel plura; antherae rubicundae, bracteae glandulosae, deciduae. Fructus subglobosus, 6–10 mm. diam., intense scarlatinus pulpa succulenta matura flava; calyx parvus, fere sessilis; sepala serrata, fructu maturo decidua.

and bristly stems, is often abundant in rocky ground on the mountains and in glades.

Rosa carolina L. A widely distributed low Rose, found in open woods, but not very common here.

Rosa Lyoni Pursh. This species differs from the last principally in its pubescent foliage, and it is much commoner in the Hot Springs area.

Prunus serotina Ehrh. The Wild Cherry is found in the valleys and on some of the rocky mountain slopes, where it is often abundant.

Prunus lanata (?) (Sudw.) Mack. & Bush. This is the commonest wild Plum of the Ozark region. It sometimes becomes a small tree 6 to 8 meters tall. It differs from the more widely distributed *Prunus americana* Marsh., in its pubescent foliage. It is common in the Hot Springs area, growing in the rocky valleys and on the mountain sides. This is the plant that was once described by Professor Sargent as *Prunus arkansana*, and there is some doubt in the writer's mind as to whether it is identical with the above species, to which it has been more recently referred.

Prunus mexicana Wats. Big Tree Plum. This southwestern species is found in situations similar to the last. It sometimes becomes a larger tree and the leaves are also larger and rugosely veined.

Prunus americana Marsh. This species is mainly of more northern range, and it is apparently not very abundant in the Hot Springs area.

Prunus Munsoniana Wight & Hedrick. This shrubby or sometimes arborescent plum is most abundant in the prairie regions to the west and south, and it may be a recent introduction here, where it is not common.

Prunus Reverchonii Sarg. This southwestern species, hitherto known only from Texas and Oklahoma, was collected in a thicket along a small rocky stream near Hot Springs. It is a shrub seldom more than 1 or 2 meters tall.

LEGUMINOSAE

Cercis canadensis L. The Redbud is found in the rocky valleys and on the mountains, where it is often abundant. The deep pink or magenta flowers make it a beautiful feature of the early spring woods.

Gleditsia triacanthos L. The Honey Locust is found in woods along the stream valleys, but is not very common here.

Gymnocladus dioica (L.) K. Koch. Kentucky Coffee-tree. This tree was seen only along the rocky bluffs of the Ouachita River, near Lawrence. Although it may occur elsewhere it is probably rare in the area.

Robinia pseudoacacia L. Black or Kentucky Locust. Found rather abundantly on some of the rocky mountain slopes, where it is undoubtedly native.

Amorpha fruticosa L. False Indigo. This shrub grows along the margins of pools on the Ouachita River and some of the larger creeks.

Amorpha tennesseensis Shuttl. This species, which is quite similar to the last, was found along the Ouachita River.

Amorpha glabra Desf. On dry rocky banks and mountain slopes.

Amorpha croceolanata Wats. A tall shrub, much larger than any of the other species growing in the region, some specimens being two meters or more in height. It is abundant along rocky ravines and on some of the mountain slopes. This species appears to be well marked and distinct, and I see no reason why it should be regarded as a variety of *A. fruticosa*, as Schneider has proposed.

Amorpha nitens Boynton. This is a slender shrub, as found here, seldom over one meter in height. It grows in frequently flooded but rocky ground along the margins of Hot Springs Creek and the Ouachita River. I was at first inclined to regard this as an undescribed species, but careful examination fails to show any good characters to distinguish it from this southeastern species, which is not known to have been previously found west of the Mississippi River. The foliage of this plant turns black in drying.

Wistaria macrostachya T. & G. This handsome flowering vine was found in the valley of the Ouachita River, in rocky ground subject to overflow.

RUTACEAE

Zanthoxylum americanum Mill. A small thicket of this northern Prickly Ash was found in open rocky woods along Gulpha Creek, near Hot Springs. It is apparently rare in this area.

Zanthoxylum Clava-Herculis L. Tooth-ache Tree. This small tree is a species of the coastal plain, and was noted here only near the Ouachita River in the vicinity of Lawrence.

Ptelea trifoliata L. The Wafer Ash or Hop Tree is found on rocky open hillsides and along streams. It is abundant on the banks of the Ouachita River.

Poncirus trifoliata Raf., the Wild Orange, was noted growing wild and fruiting in the National Park and in the environs of Hot Springs.

EUPHORBIACEAE

Andrachne phyllanthoides (Nutt.) Muell. Arg. This curious little shrub, sometimes called Buck-brush by the country people, is a native of Texas and a few scattered localities in the Ozark region. It is found in the Hot Springs area growing on rock outcrops in the beds of creeks and along the Ouachita River. It is most abundant on shale banks in the flood-plains of the river. The foliage is eagerly eaten by stock and is usually kept cropped down where it is accessible.

ANACARDIACEAE

Rhus canadensis Marsh. Fragrant Sumac, Coffee-berry. This slender shrub is often common on rocky banks and in open glades.

Rhus copallina L. This small tree or shrub, in common with the next species, is called Sumac or Shoemake, and the two are scarcely distinguished by the country people, although well marked botanically. It grows in thickets and rocky open ground along the streams.

Rhus glabra L. This species grows in situations similar to the last, but is perhaps less common.

Rhus Toxicodendron L. Poison Ivy, Poison Oak. This shrub, or sometimes scandent vine, is well known for the supposed poisonous character of its leaves. Persons with tender skins should beware of it, although many, like the writer, seem to be ordinarily immune to it.

Rhus quercifolia (Michx.) Steud. This small species is seldom over three to five decimeters in height. The leaves have the same irritating or poisonous quality as in the last named plant.

AQUIFOLIACEAE

Ilex opaca Ait. Holly, Christmas Holly. Found occasionally in the valleys and on steep hillsides. It is usually only a shrub in this area, with a maximum height of four or five meters.

Ilex decidua Walt. Bearberry, Henberry. Rather common in thickets, especially in the flood plains of the Ouachita River and the larger creeks.

Ilex caroliniana (Walt.) Trel. This low shrubby species is often common on steep mountain slopes and rocky banks of streams.

Ilex vomitoria Ait. This species is a native of the coastal plain, and apparently reaches its northern limit in the Mississippi valley here. It is found sparingly along the rocky banks of Hot Springs Creek and the Ouachita River. It is a tall shrub, sometimes five or six meters high. In the South it is known as Youpon or Yaupon.

CELASTRACEAE

Evonymus americanus L. Strawberry Bush. This slender shrub, which is very showy in autumn on account of its scarlet and carmine fruit, is abundant in moist sandy ground and on protected banks in the stream valleys and mountain canyons.

HIPPOCASTANACEAE

Aesculus discolor var. *mollis* Sarg. Red-flowered Buckeye. A shrub of the coastal plain, noted here only in the valley of Gulpha Creek, where it is not very abundant.

STAPHYLEACEAE

Staphylea trifolia L. Bladdernut. A northern shrub, found rarely in canyons or on cold north mountain slopes.

ACERACEAE

Acer saccharinum L. Silver Maple, Soft Maple. This tree grows abundantly on the banks of the Ouachita River, and a few small specimens were noted in the valley of Hot Springs Creek, but it is probably escaped from cultivation in the latter place.

Acer rubrum L. The typical Red Maple is occasionally found in the valleys or on the lower mountain slopes, but it is much less common than the variety below.

Acer rubrum var. *tridens* Wood. This variety, distinguished from the typical form by its smaller three-lobed leaves, is abundant along all of

the mountain streams, and in autumn forms a conspicuous feature of the landscape on account of its brightly colored foliage. The leaves here, however, in almost all cases turn yellow or orange instead of the usual crimson color which has given the popular name to the tree.

Acer leucoderme Small. Hard Maple. This southern species is found along rocky bluffs and ravines of the various branches of Gulpha Creek, and in some protected situations it has descended into the valleys. It is often a shrub only three or four meters in height, but in the more fertile soils it sometimes becomes a small tree up to ten meters tall, with crooked much branched stems and pale bark. This station is farther north than any previously known for the species. The leaves of many of the trees here are nearly glabrous, at least when mature, and this character made me at first suspect that they might be specifically distinct, but examination of a series of specimens from Georgia, Alabama and Tennesses shows a number of them nearly approaching the Arkansas specimens in this respect. In Small's description of *Acer leucoderme* it is stated that the leaves are velvety to the touch on the under surface. This character cannot be regarded as constant if this glabrous form is to be included with the species, as I have thought best to do. However, the species is well distinguished from all others of the Sugar Maple group by its small, relatively broad leaves, usually with three entire lobes, of the same yellow-green color on both sides, and by its crooked branching habit and pale yellowish bark.

RHAMNACEAE

Rhamnus caroliniana Walt. Indian Cherry. Found in thickets along Gulpha Creek, but not common.

Berchemia scandens (Hill) Trel. Rattan Vine, Supple Jack. This stout twining vine is rather abundant in thickets on hillsides and along streams.

Ceanothus americanus L. New Jersey Tea. This small flowering shrub is very common in the National Park and in open rocky woods throughout the area. The leaves are generally narrower and smaller here than in the typical plant farther east.

VITACEAE

Vitis cordiformis Michx. Winter grape, Bird Grape. Common in woods and thickets along streams and sometimes on the rocky mountains.

Vitis palmata Vahl. Growing abundantly in the rocky flood plains of the Ouachita River. It is a high climber in trees and over bushes.

Vitis rupestris Scheele. This species is a low trailing shrub or sometimes slightly viny, but scarcely climbing. It is known as Sand Grape, or sometimes as Sugar Grape from the sweet fruit. It is found here along the rocky flood plains of the Ouachita River.

Vitis Linsecomii var. *glauca* Munson. Post Oak Grape, Summer Grape. This is common in dry rocky woods throughout most of the Ozark region. It is fairly frequent here in such situations and on the mountains, where

it sometimes climbs over bushes or into small trees, or oftener is trailing over rocks. It may be known by its very large leaves, whitish beneath, its purple branchlets and the large, usually flattened berries, which are sweetish but somewhat astringent.

Vitis Lecontiana House. This species is found in situations similar to the last, which it somewhat resembles, but it is a taller climber, and the flowers appear and fruit is ripened later; the berries are also smaller and spherical.

Vitis cinerea Engelm. Winter Grape. Found in thickets and moist or alluvial ground along streams, but not very abundant.

Vitis rotundifolia Michx. Muscadine. This vine, well known for its large sweet fruit, is sometimes found here on the mountains, but is most abundant in sandy or gravelly soil along streams.

Parthenocissus quinquefolia (L.) Planch. Virginia Creeper. Found in thickets and woods, especially along streams.

Parthenocissus quinquefolia var. *hirsuta* Planch. This variety, with pubescent foliage, often grows in dryer situations than the last, and is perhaps more common.

Cissus incisa Desmoul. A trailing vine with thick succulent leaves, growing along rocky ledges and bluffs with south or west exposures. It was found here along the Ouachita River near Lawrence.

Ampelopsis cordata Michx. False Grape. This vine was seen in a few places along streams, but is not common.

Ampelopsis arborea (L.) Koehne. Pepper Vine. Found in thickets and moist ground along streams.

TILIACEAE

Tilia floridana Small. Linden. This tree is rather frequent in the valleys and is also sometimes found on the mountains, especially on the north slopes.

Tilia caroliniana Walt. A few trees of this southeastern species were found in the valley of Hot Springs Creek and along the Ouachita River.

GUTTIFERAE

Ascyrum hypericoides L. St. Andrew's Cross. This diminutive shrub which gets its popular name from the arrangement of the four narrow petals of the flowers, is often abundant in dry rocky woods and on mountain slopes.

Ascyrum stans Michx. Found in sandy bogs and in moist sandy soil along the streams.

Hypericum prolificum L. Shrubby St. John's Wort. Often abundant in gravelly or rocky ground along streams, especially so in the flood plains of the Ouachita River.

Hypericum cistifolium Lam. This small barely woody species is found in rocky or gravelly ground along the borders of streams, it is abundant in the rocky flood plains of the Ouachita River, near the mouth of Hot Springs Creek.

Hypericum adpressum Bart. This little shrub was also found along the Ouachita River, in rocky ground subject to overflow.

CACTACEAE

Opuntia humifusa Raf. This small Prickly Pear is abundant in many localities, on shale outcrops.

Opuntia sp.? Found growing from clefts of trap-rock, along dry exposed bluffs. The narrow flattened joints are sometimes two decimeters in length and are nearly or quite spineless.

NYSSACEAE

Nyssa sylvatica Marsh. Black Gum. This is a common forest tree in the stream valleys and in places on the mountains.

ARALIACEAE

Aralia spinosa L. Tear-blanket, Devil's Club. This slender spiny tree is found along the borders of small sandy bogs or in coves on the mountain sides.

CORNACEAE

Cornus florida L. Flowering Dogwood. This small tree, so well known for its showy flowers appearing in early spring, is common here in open rocky woods, both in the valleys and on the mountains.

Cornus racemosa Lam. This is a tall shrub, sometimes three or four meters in height. The flowers are small and borne in large panicles, and resemble superficially those of the Black Haw. It grows in the Hot Springs area in moist ground along the creeks, where it is often abundant. By the country people it is scarcely distinguished from the next species, both of them being known as Dogwood.

Cornus asperifolia Michx. This species somewhat resembles the last, but the leaves are hirsute and harsh to the touch. Although the collections show no specimen taken within the area of this survey, it has been found in the County at no great distance, and as it is the commonest Cornel of the region there can be little doubt that it occurs here.

ERICACEAE

Rhododendron roseum (Loisel.) Rehd. Azalea, Honeysuckle. This handsome flowering shrub is found in deep rocky ravines and on steep north slopes of the mountains. The flowers, appearing before the leaves, are of a beautiful rose-pink color, and are larger than in the next two species. They are gathered in large quantities by the natives and offered for sale on the streets and at the hotels to the spring tourists.

Rhododendron canescens (Michx.) Sweet. This species grows in similar situations to the last. The smaller, paler flowers appear two or three weeks later and develop with the leaves. The flowers, although not so showy as those of *R. roseum*, are also sometimes offered for sale.

Rhododendron oblongifolium (Small) Millais. The flowers of this species are the last to open, often blooming as late as the middle of May. They are small, and although faintly tinged with pink in the bud, soon become

pure white. This is a species of sandy bogs and is restricted to such places and to the vicinity of perennial streams.

Xolisma mariana (L.) Rehd. This little shrub, with its showy spikes of small bell-shaped flowers, is a species of the coastal plain, but is sometimes found near streams along the margins of the Ozark region. It was collected here in wet ground along a small creek about two miles south of Hot Springs.

Xolisma ligustrina (L.) Britton. Male-berry. Found in sandy bogs and along the borders of perennial streams.

Xolisma ligustrina var. *foliosiflora* (Michx.) Mohr. Grows with the typical form, from which it differs in the leafy flowering panicles.

Vaccinium arboreum Marsh. Tree Huckleberry. This species sometimes becomes a small tree but is more commonly a stout shrub. It is common in many places on the mountains and in dry rocky ground in the valleys.

Vaccinium stamineum Ait. High-bush Huckleberry. This species is common in open rocky woods and glades, especially on the mountains. The bushes are often a meter to a meter and a half tall. The fruit is of good size and quality and is often gathered by the country people and sometimes sold on the market.

Vaccinium corymbosum L. Swamp Huckleberry. This tall shrub, which is sometimes three meters in height, is a species of the coastal plain, and is found here only in the small sandy bogs along creeks. The fruit is edible but the plants are not common enough here for it to be of much importance.

Vaccinium vacillans Kalm. Mountain Huckleberry, Low Huckleberry. This is a low shrub of the rocky woods and mountain sides. The stems and branchlets are green and glabrous. It fruits abundantly but is much less common than the following variety.

Vaccinium vacillans var. *crinitum* Fernald. This is the common low Huckleberry of the Ozark region, and it is often very common here, especially on the mountains. The fruit ripens earlier than in the other species, and the berries, although small, are in great profusion, and are gathered and sold in large quantities.

Vaccinium virgatum Ait. Found in sandy bogs and moist rocky ground along streams. The slender erect bushes are sometimes nearly a meter in height, and the abundant fruit is small but edible.

Vaccinium virgatum var. **speciosum,** var. nov.[1] This variety, which was found on rocky open banks near High Point, and also more abundantly along a small branch about two miles south of Hot Springs, differs from the typical form in having the flowers in terminal spikes 10–15 centimeters long, closely congested or but slightly interrupted. The flowers, which are of a delicate pink color, are also slightly larger than in the typical form, the corollas being from 8 to 10 mm. in length. The plants seen

[1] **Vaccinium virgatum** var. **speciosum,** var. nov. A typo recedit floribus paulo majoribus, inflorescentiis dense racemosis.—Frutex erectus gracilis, circiter 5–8 dm. altus.

were from 5 to 8 decimeters tall, slender and but little branched. It is the handsomest of all the native Vacciniums in flower, and would be quite ornamental in cultivation. The type specimens are my numbers 24548, High Point, April 25, 1924, for flowers, and 37127, Hot Springs, May 10, 1925, for fruit.

EBENACEAE

Diospyros virginiana L. Persimmon. Rather frequent on borders of woods, especially in the rocky creek valleys. There is considerable variation in the size, quality and time of ripening of the fruit here, as throughout the region. One tree found on the rocky banks of Gulpha Creek about half a mile below the railroad bridge, had leaves and branchlets densely and permanently fine hirsute. In the pubescence of the leaves it resembles extreme forms of the var. *platycarpa* Sarg., but not in their small size or in the small fruit. Specimens with similar foliage were collected by Mr. B. F. Bush, near Greenwood, Missouri, a few years ago. The Missouri plants, however, were mostly small shrubs, while this is a tree 12 or 15 meters tall. This should perhaps be distinguished as a variety, but I hesitate to do so until it is better known.

SAPOTACEAE

Bumelia lanuginosa (Michx.) Pers. This small tree, called Gum Elastic in the South, is rather frequent here in rocky ground along bluffs and streams.

STYRACACEAE

Styrax americana Lam. Storax. This shrub is usually a denizen of low swampy ground, but it is growing here along the rocky margins of the Ouachita River, where it is subject to frequent inundation or overflow.

Styrax grandifolia Ait. This handsome shrub is found in the rocky valleys of some of the mountain streams, and it sometimes also grows on rocky bluffs. The flowers are much larger than in the last species, and are in great profusion. The plants are usually 1 or 2 meters high, but some specimens seen in the valleys reached a height of five or six meters and were really small trees.

Halesia monticola var. *vestita* Sarg. Silver-bell Tree. Seen only along the Ouachita River, where it is not common. Although it becomes a good sized tree in the southern Appalachians, it is usually only a shrub here, from 2 to 4 meters tall. The flowers, at first green, become pure white when fully grown and are very handsome.

OLEACEAE

Fraxinus americana L. The White Ash is rather abundant in the valleys and is sometimes also found on mountain sides.

Fraxinus pennsylvanica var. *lanceolata* (Borkh.) Sarg. Green Ash. Found only in moist or alluvial ground in the valleys of the larger streams.

APOCYNACEAE

Trachelospermum difforme (Walt.) Gray. This slender woody vine is rather abundant in wet ground along streams.

BIGNONIACEAE

Campsis radicans (L.) Seem. Trumpet Creeper. This stout woody vine is abundant in thickets and low woods along the larger streams. It is often a high climber on trees, but in open ground sometimes prostrate or appearing shrubby.

Bignonia capreolata L. Cross Vine. This handsome vine grows in situations similar to the last, but is less common. It is a high climber on trees.

Catalpa speciosa Warder. This species and also *Catalpa bignonioides* (L.) Karst. were found growing in waste ground in the valley of Hot Springs Creek, where they have been introduced from seeds spreading from cultivated trees.

RUBIACEAE

Cephalanthus occidentalis L. Button-bush, Button-Willow. Found in sandy bogs and in low ground along the larger streams.

CAPRIFOLIACEAE

Sambucus canadensis L. The Elder or Elder-berry Bush is found in rich alluvial ground along streams.

Symphoricarpos orbiculatus Moench. Buck-brush, Coral-berry. Sometimes found in thickets, especially in the creek valleys, but nowhere common.

Viburnum prunifolium L. Black Haw. This species of the Northern and Eastern States was noticed in several places along the small creeks, but it is not common here.

Viburnum rufidulum Raf. This southern species is much more abundant than the last, from which it is not distinguished by the general public. It is found in thickets and open rocky woods, and sometimes becomes a small tree. The fruits of this and the last species are edible and are often gathered by children.

Viburnum nudum L. This Coastal Plain species is found here only in the small sandy bogs along the mountain streams, where it is sometimes locally abundant. The small blue berries are inedible and disagreeably scented.

Lonicera flava Sims. Yellow-flowered Honeysuckle. Common along bluffs of streams and rocky ledges on the mountain sides.

Lonicera sempervirens Ait. Trumpet Honeysuckle. This pretty species is found in thickets along the small stream valleys.

Lonicera japonica Thunb. The Japanese Honeysuckle is abundant as an escape from cultivation in the vicinity of Hot Springs, and it may well become a troublesome weed here, as it has in many places in the Southern States.

LEAVES FROM A COLLECTOR'S NOTE BOOK

ERNEST J. PALMER

Milwaukee, Wisc., Sept. 17th, 1925

This afternoon Mr. Teuscher and I, guided by Mr. Fuller of the Milwaukee Public Museum, visited the sand dunes along Lake Michigan, about three miles south of Sheboygan. These are the most extensive dunes we have seen on the west shore of the lake. In places the sand deposits must extend more than half a mile back from the shore, and we followed them for more than a mile along the lake front. The fine sands are heaped up in mounds and ridges or hollowed out in troughs and depressions, characteristic of such aeolian deposits. Beds of coarse gravel underlie the sand, as is shown in deep pits from which it has been in places removed. Near the shore and in the more unstable parts of the dunes, plant growth is sparse and consists of a few species of typical sand plants, mostly annual herbs and perennial sedges and grasses. *Cyperus Schweinitzii* Torr. and *Amnophila breviligulata* Fernald are at this season amongst the most conspicuous; *Cakile edentula* Hook., *Euphorbia glyptosperma* Engelm. and *Lathyrus maritimus* Bigel. are also common in such places. *Selaginella rupestris* Spring is found in depressions and *Cirsium undulatum* Spreng. in the higher parts of the dunes. The woods and thickets bordering the dunes are made up of a great variety of deciduous trees and shrubs and several Conifers. Along this border there is the usual constant struggle going on between the encroaching sands and the more hardy of the forest plants. The most abundant Conifers are *Pinus Strobus* L., *Thuja occidentalis* L. and *Picea mariana* B.S.P. In the deep sands the woody part of the flora is often limited to a few species of shrubby Willows and two low growing Junipers; *Juniperus communis* var. *depressa* Pursh is frequent and *Juniperus horizontalis* Moench. covers large areas. This last named species is growing here to great perfection and is a very striking plant. It forms in places a perfect ground cover, almost as thick as grassy turf, the little branchlets ascending to a height of only a decimeter or so above the prostrate main branches. These mat-like expanses are often many meters in extent, apparently having originated from single plants or from only a few individuals.

In some of these colonies a curious variation has arisen: ascending from the prostrate or creeping branches are erect tree-like growth with fascicled branchlets and dense acicular foliage. These upright growths are often two to three decimeters or more in height, and they present a striking contrast to the normal prostrate parts of the plants. Where they are common, as in some colonies we saw, they suggest a pygmy forest with a dense undergrowth of shrubs or vines. There was no fruit on any of the erect branches, although it was abundant on many of the prostrate ones. This form, which appears to be merely a monstrosity, seems to be identical with the plants recently discribed by Mr. Alfred Rehder (in

Jour. Arnold Arb. VI. 203 [1923]), as *Juniperus horizontalis* f. *alpina*, from plants cultivated at the Arnold Arboretum and received there from the Ellwanger and Barry nursery, Rochester, New York. The occurrence of this curious form as a native plant at the Wisconsin locality is interesting, since nothing is known as to the origin of the cultivated plants, which were first grown in English gardens.

Webb City, Missouri, Oct. 5th.

Today Mr. B. F. Bush and I, starting from Baxter Springs, Kansas, explored some high limestone bluffs along Spring River, following them for several miles down stream to a point a short distance beyond the Oklahoma state line, where they terminate in an alluvial bottom. In the rocky woods near Baxter Springs we found *Quercus velutina* var. *missouriensis* Sarg. and also fruiting specimens of *Ilex decidua* Walt. The latter is a southern species which barely gets into the state in this southwestern corner. *Bumelia lanuginosa* Pers. is fairly abundant, and last year I found some small specimens of *Sapindus Drummondii* H. & A. along the bluffs. Both of these, however, although they are typical trees of the Southwest, extend for some distance farther into Kansas. The three species of Vaccinium found here are also restricted to this corner of the state: these are *Vaccinium arboreum* Marsh., *V. vacillans* Kalm and *V. stamineum* Ait. Near the end of the bluff we found several small trees of *Ulmus alata* Michx., a species which I believe has not yet been found in Kansas, and we at first thought that we had secured evidence of an interesting addition to the tree list of the state, but inquiry from a farmer in the vicinity, later confirmed by consulting the topographical map, proved that they were really growing a few hundred yards south of the state line, and in Oklahoma. There can be little doubt, however, that scattered specimens might be found near here, within the borders of Kansas.

Fulton, Arkansas, Oct. 30th.

The autumn coloring of the Ozark and southern forests has been unusually brilliant this season. Following a dry summer, rains began late in September and have been so frequent and heavy during the past four or five weeks as to do much damage to highways, railroads and standing crops. Light frosts occurred during the second week of September in southern Missouri and northern Arkansas; tender herbage was killed over the northern tiers of counties in this state on September 13th, and on Thursday night (Oct. 29th) there was a light fall of snow, flurries being recorded as far south as Little Rock. This combination of drought succeeded by cool rains and premature frosts has doubtless hastened and accentuated the process of transforming the uniform green of the summer landscape into the multi-colored georgeous robes which it now wears.

There appears to be much variation in the colors assumed by the leaves of plants, even within the same species, and these differences cannot readily be accounted for on ecological grounds, since specimens standing

in close proximity sometimes display a marked contrast. This is noticeable in many of the Oaks, Maples, Sassafras, Sweet Gum and various members of the Rosaceae. The Hickories seem to be amongst the least variable, always, so far as I have observed, assuming some shade of yellow before becoming bronzed by the late frosts; the Elms regularly assume similar colors, as do also the Mulberry and Sycamore. The Sumacs, Dogwoods and Black Gum seem equally partial to the brilliant shades of red; the last (*Nyssa sylvatica* Marsh.) is one of the most uniformly as well as most georgeously colored trees of the autumn forest. When seen at its best in bright sunlight it is often of a rich scarlet or brilliant crimson color, that can be compared only to the tints sometimes seen in a waning sunset, and which no artist's brush can imitate.

The Sweet Gum (*Liquidambar Styraciflua* L.) is also often splendidly colored at this season, and its foliage shows, perhaps, the greatest diversity in coloring of any of our forest trees. The color most commonly seen is some shade of red, but on many trees the leaves early turn to a pale yellow, which may gradually deepen to orange or become flushed with pale crimson. Sometimes in a single group trees of these shades may be found growing closely associated with others in which the leaves are of a brilliant crimson or dark crimson-purple color; in some cases it becomes almost a black-purple, which is the darkest color I have ever seen in the leaves of any American tree. Again, in the same group some trees may be found in which the leaves have remained quite green, or the curious phenomenon is often observed of some part of the tree, or perhaps a single branch, being brilliantly colored while the foliage of the rest of the plant remains green. Such contrasts in coloring in a single plant are quite striking, but are more easily accounted for than are the differences in colors of entire trees growing together under apparently identical conditions; for in the case of the prematurely discolored branches it is doubtless due to an injury, or to some cause that has partially impeded the sap circulation.

Today, near Fulton, I observed such a case: on a tall pyramidal tree, about 25 or 30 meters in height, a single branch not far from the base of the crown stood out on account of its dark purplish-crimson color from the green foliage of the rest of the tree. Several small saplings near by were also still green, but on one medium sized tree not more than 20 meters away, all of the leaves had turned bright red. It is interesting to note in this connection that woodsmen and lumbermen in the South often insist that there are two distinct varieties of this tree, which, they distinguish as Sweet Gum and Red Gum; the wood of the latter, it is claimed, is of a superior quality and of a deeper color; and it is this variety that furnishes the lumber used extensively for furniture and for interior decorations under the trade name of "Circassian Walnut." Botanists have been unable to discover any morphological differences by which these supposed varieties can be distinguished.

This afternoon, after spending most of the day in the sand hills about

McNab I got into a bit of low woods along Yellow Creek. The soil here is a black gumbo or stiff clay; the surface is flat and subject to frequent overflow, but is not swampy for the most part, and in summer and autumn it often becomes very dry. Characteristic trees are *Carya myristicaeformis* Nutt., *Quercus Shumardii* Buckl., *Ulmus crassifolia* Nutt., *Sophora affinis* Torr. & Gr. and *Sapindus Drummondii* Hook. & Arn. This is the only locality in the state where I have found either of the last two species abundant. There are many specimens of Sophora, some of them being 10 or 12 meters in height. The Sapindus is even more abundant; I estimate the largest trees to be over 15 meters in height and 3.5 decimeters in trunk diameter. Both were fruiting abundantly.

Crossing or rather wandering through the woods I came out on the shore of Grassy Lake. This is a body of shallow water, or during most of the year and over much of its area, marsh land, fed and drained by Yellow Creek. It also receives the drainage from the higher ground on the north through several small streams and seeping springs. The lake, in its main axis, from southeast to northwest, is about three and a half miles long, and its area is something over two square miles. The past summer has been unusually dry, causing most of the water to disappear from the lake.

I walked for some distance across mud flats, over which were scattered thousands of dead mussel shells, mostly of a large species of Anodonta; and there were also many carapaces of turtles of two or three sorts. It is said that the deeper parts of the lake abound in alligators, and some large ones have been killed or captured during the present drought, as they can be seen readily when they come up from their "wells" to breath or forage.

I made towards a group of tall Cypress trees (*Taxodium distichum* Rich.) in the hope of securing some seeds which were wanted for planting; but few of the trees seemed to be bearing cones, and those I saw were too high to reach and had not yet begun to fall. However, there were thousands of fine young seedlings coming up all about the grove. These were evidently from last year's seeds and were from one-half to three and a half decimeters in height. Apparently the seeds of this tree germinate only when the cones fall in mud or shallow water, where they can become thoroughly saturated; then after the water recedes or if the mud does not dry too quickly, the seeds begin to germinate under the action of the hot sun. Earlier in the season I observed this also near Monroe, Louisiana, where countless young seedlings were springing up along the muddy margin of a retreating bayou.

Evidently at this southeastern end of the lake the water is never of much depth and does not at any time cover all of the surface, for besides the occasional groups of Cypress and other scattered trees, there are many clumps of *Cephalanthus occidentalis* L., *Cornus stricta* Lam. and other shrubs, and on hummocks and about old stumps and logs are growing

tussocks of tall swamp grasses and sedges and a variety of weeds. The Composite vine *Mikania scandens* Willd. is very abundant and is conspicuous now on account of the fluffy white pappus of the achenes, released by the recent frosts. Amongst trees growing here, besides the Cypress, I noted the Black Willow (*Salix nigra* Marsh.), Swamp Hickory (*Carya aquatica* Nutt.), Overcup Oak (*Quercus lyrata* Walt.), Water Elm (*Planera aquatica* J. F. Gmel.), Swamp Honey Locust (*Gleditsia aquatica* Marsh.) and Green Ash (*Fraxinus pennsylvanica* var. *lanceolata* Sarg.).

A steady drizzling rain had been in progress for some time, making the walking slippery and the weeds and shrubs very wet. Seen under these conditions through the fog and mist it would be hard to imagine a more dismal landscape. The tangle of bushes and vines about the margin of the lake became in places quite impenetrable, but there were some open spaces where pools had been, and various paths or channels, some of which ended in blind alleys. Picking my way through these I soon lost all sense of direction, and as the rain was becoming heavier, with no sort of shelter in sight, and evening approaching, it occurred to me that it would not be a very desirable place in which to spend the night. I happened to have a compass with me, by the aid of which I steered a course as directly south as the difficult going permitted, and in a short time I was relieved to find myself again on the banks of Yellow Creek, which I followed down to the railroad, and after a four miles further tramp reached Fulton sometime after dark.

Many of the Hickories and some Oaks are not fruiting this year, due to late frosts which occurred at the time the trees were flowering in March and April. In southern Missouri and northern Arkansas scarcely any nuts are to be found and even so far south as Fulton the crop is very short; of the many Hickory trees I noticed today perhaps less than twenty-five per cent had any fruit. In the upland woods south of McNab I found a tree of *Carya alba* var. *ovoidea* Sargent, of which I secured herbarium specimens and fruit. The nuts are identical in shape with those of the type tree of this variety, which was found at Noel, Missouri. This appears to be rather a rare form, and it is the first time I have seen it in Arkansas. It is also interesting as another addition to the long list of woody plants found in the Fulton region. Since publishing the list in the Journal of the Arnold Arboretum for January, 1923, I have made several other trips to this remarkable locality and have found a number of woody species not then known to occur here. For the sake of completeness the following should be added to the list:

Yucca glauca Nutt. Growing in sandy fields and open woods near McNab.

Salix longifolia Muhl. Banks of Red River, near Fulton, and also along small creeks near McNab. It is growing here as a shrub up to 3 or 4 meters in height.

Carya alba var. *ovoidea* Sarg. Upland woods near McNab, as noted above.

Quercus stellata var. *araneosa* Sarg. In deep sands, on hillside near McNab.

Quercus obtusa Ashe (Q. rhombica Sarg.). Moist sandy banks of bridge Creek, near McNab.

Quercus rubra var. *leucophylla* Ashe. Growing with the typical form in upland woods near Fulton and McNab.

Quercus nigra var. *heterophylla* (Ait.) Ashe. In low woods near Fulton and McNab. This variety is sometimes well marked and is appropriately named, as the leaves are remarkably variable in size and lobing.

× *Quercus Rudkinii* Trelease. A tree which from the character of its foliage and fruit appears to be this hybrid (*Q. marilandica* × *Phellos*) is growing on the edge of a flat upland woods a short distance from Fulton. Both supposed parent species are abundant in the vicinity.

Philadelphus pubescens Loisel. On sandy north-facing banks of deep ravines, near McNab. This is the most southwestern station at which I have seen this handsome shrub.

Malus angustifolia Michx. Collected near McNab, where it is locally abundant on the edge of woods. Probably the plants found near Fulton and included in the original list as *Malus ioensis* var. *Palmeri* should also be included with this southern species.

Zanthoxylum americanum L. A specimen collected by B. F. Bush, at Fulton, is in the Arnold Arboretum herbarium. I have not seen it so far south.

Vitis vulpina L. In low ground along Red River, near Fulton.

Opuntia humifusa Raf. This low-growing species of Prickly Pear may be added to the list, if it is to be regarded as a woody plant, since it is found frequently in clay barrens.

Vaccinium Elliottii Chapm. In low sandy woods near McNab.

Bumelia lycioides (L.) Gaertn. Several small trees, with ripe fruit, were discovered in low woods along Yellow Creek, in October, 1924.

Viburnum nudum L. A specimen of this species, collected by B. F. Bush, and labeled from Fulton, is in the herbarium of the Arnold Arboretum. It probably came from the sandy bogs near McNab, as it is abundant in such situations near Texarkana.

Several other woody plants have been reported as occurring near Fulton, but which I have not yet been able to confirm by personal observation or examination of specimens. Further exploration will doubtless add to the above list.

Ft. Worth, Texas, Oct. 31st.

The Trinity River, which in southern Texas becomes an imposing stream, is here little more than a large creek, and in dry seasons one can walk across its rocky bed at many places without danger of wetting the feet. The banks and immediate vicinity of the stream were originally wooded with a growth of moderate sized deciduous trees. Most of this has been cleared away now, but fortunately the City of Ft. Worth is preserving

a considerable tract on the right or south bank of the river, under the name of Trinity Park. The forest growth consists principally of Pecan (*Carya pecan* Engl. & Graebn.), Bur Oak (*Quercus macrocarpa* Michx.), Texas Red Oak (*Q. texana* Buckl.), Cedar Elm (*Ulmus crassifolia* Nutt.), White Elm (*U. americana* L.) Winged Elm (*U. alata* Michx.), Red Mulberry (*Morus rubra* L.), Box Elder (*Acer Negundo* var. *texanum* Sarg.), Soapberry or Wild China (*Sapindus Drummondii* Hook. & Arn.), Buckthorn or Gum Elastic (*Bumelia lanuginosa* Pers.) and White Ash (*Fraxinus americana* L.). The Big-tree Plum (*Prunus mexicana* Wats.) Texas Green Haw (*Crataegus Reverchonii* Sarg.), Deciduous Holly (*Ilex decidua* Walt.), Rough-leaved Dogwood (*Cornus asperifolia* Michx.) and southern Black Haw (*Viburnum rufidulum* Raf.) are also abundant as small trees or shrubby undergrowth. Along the immediate banks of the river one sees the Black Willow (*Salix nigra* Marsh.), Cottonwood (*Populus balsamifera* var. *virginiana* Sarg.), Sycamore (*Platanus occidentalis* L.), Green Ash (*Fraxinus pennsylvanica* var. *lanceolata* Sarg.) and the Poison Ivy (*Rhus Toxicodendron* L.). Here I was surprised to find also the Dutchman's Pipe vine (*Aristolochia tomentosa* Sims.), climbing high in the trees, with an abundance of its curious hexagonal pods. Indeed, except for the paucity of species and the absence of many familiar plants, the woods here have qiute a familiar aspect, judged by the standards of the eastern and middle-western states. This is in striking contrast to the xerophytic Sonoran flora that begins to appear on the limestone hills and mesas a short distance to the southwest. One is reminded, however, of the proximity of this western flora by coming upon a few representatives of it here. The Mesquite (*Prosopis juliflora* DC.) is appearing on prairies and *Sophora affinis* T. & G. in open woods. On the river banks the Mustang Grape (*Vitis candicans* Engelm.) is abundant, and I also found here *Solanum triquetrum* Cav. and *Rivina humilis* L. But the most interesting tree I have seen is the western Walnut (*Juglans major* Heller), of which two or three small trees were seen in the park and two medium sized specimens, the larger being perhaps 10 meters high, on the banks of the river about a mile farther down. There was not much fruit on the trees this year, but enough to verify the identification. This species differs from its close relative, *Juglans rupestris* Engelm., in its larger nut, which is sometimes 2.5 to 3 centimeters in diameter, and in the fewer and broader leaflets. This locality is much farther east than I had previously seen it and far beyond the range given in the manuals.

In going back through the park I picked up some acorns of the Bur Oak, which were of unusual size and form. The cups are broadly bell-shaped or almost basin-like and much depressed, as are also the nuts. The fringe of the cups is remarkably developed, the band being more than two centimeters thick above. The total diameter of the largest specimen taken is eight and its height four and a half centimeters. I remember collecting a similar form near San Saba, Texas, along the river of the same name, a few years ago.

Little Rock, Arkansas, Nov. 7th.

A short time ago, in going from Texarkana to Hot Springs on the Missouri Pacific railroad, I noticed some plants of what appeared to be the Sweet Bay (*Magnolia virginiana* L.) in a bit of swampy woods a few miles south of Malvern. As I had not previously found this plant so far north in the state I resolved to come back at the first opportunity and investigate it. This morning I left Hot Springs in the rain, which has continued most of the time for several days; and while waiting to transfer in the station at Benton there was a very heavy downpour. When I reached Malvern it was still raining, but fortunately only in light showers. As I planned to get to Little Rock to-night I changed clothes and checked my baggage in the station and after getting lunch set off about noon to walk down the railroad. After walking between three and four miles I saw the first signs of the plant I was in search of—some sprouts coming up from stumps of trees that had been cut down along the railway. Water was standing everywhere on the lowlands and wide ditches on both sides of the elevated track made it difficult to get out into the woods. After going over half a mile further looking for better specimens and a more convenient place to cross I saw some good sized trees a little way back from the railroad, but was less successful in the latter object, not even being able to discover an old tie or log that might serve as a bridge across the ditch. As it was too wide to jump and I did not propose to return without the specimens, wading seemed to be the only alternative; so taking off my boots and stockings and rolling up my trousers I crossed at a point where the water proved to be little more than knee-deep. Once across the ditch it was necessary to put on the boots again on account of briars and snags, but in going into the swamp the water was over boot tops in places. Under these circumstances I was satisfied with a rather brief exploration. There are many good sized trees of the Magnolia here, some I should judge to be ten or twelve meters tall. They grow in the deeper parts of the swamp, most of which is probably permanently boggy and all under water at present. *Ilex opaca* Ait., *Vibrunum nudum* L. and *Itea virginica* L. were growing in similar situations, and on little elevations or knolls *Myrica cerifera* L., *Rhododendron oblongifolium* Millais, and *Chionanthus virginica* L. were abundant. I hope at some more favorable time to be able to explore this bog more thoroughly.

Blue Mountain, Arkansas, Nov. 8th.

Traveling today over the Rock Island railroad from Little Rock to Blue Mountain I had an opportunity to observe again the Red Maple (*Acer rubrum* var. *tridens* Wood.), which is often abundant in low woods along the Arkansas River and along smaller rocky streams. The foliage of this tree here is in nearly all cases turning to some shade of yellow, similar to the tints assumed by the Sugar Maple (*Acer saccharum* Marsh.), and only rarely is one seen with leaves of the bright red colors usually asso-

ciated with the species, and which has given it generally the popular name of Red Maple. On most of the trees the color is now pale yellow; in some cases it is passing into orange or is tinged with a delicate pink or pale crimson; one tree was noted of a brilliant crimson color. It was, of course, impossible to determine from the train whether the trees were of the variety with trident leaves or of the typical form, but the former is much the commoner here and the typical form is in most localities entirely absent. The northern Sugar Maple is not found in this part of the state. About two weeks ago, going from Little Rock to Hot Springs on the Missouri Pacific railroad, I noticed similar coloring in hundreds of specimens of the Red Maple, and later in walks about the Hot Springs region was able to observe them at closer range and to confirm the determination. Practically all trees seen in that vicinity were of the variety mentioned above.

It has turned clear and cold to-night after the long continued rains, and there will probably be ice in the morning. Tomorrow I plan to spend on Magazine Mountain.

Poplar Bluff, Missouri, Nov. 14th.

In the autumn of 1921, while collecting in the hills just outside of Poplar Bluff and to the west of the town, I came upon several trees that I identified as *Quercus coccinea* Muench. There was no fruit on most of the trees that season, and I had to be content with examining the cups of acorns of the previous year, but these in connection with the herbarium specimens made, convinced me that I had found the Scarlet Oak of the eastern states, concerning the occurrence of which to the west of the Mississippi, at least as far south as Missouri, I had previously been in doubt. This tree, which is so well known in the region where it grows on account of the brilliant red color of its autumn foliage, has often been reported from the Trans-Mississippi region, the identification perhaps being based on no better character than the color of the autumn leaves. Most of the large herbaria contain specimens labelled *Q. coccinea* coming from the central-western and southwestern states, but for many of them which I have seen the determination is very doubtful or certainly wrong. The mistake is due to the fact that the leaves of certain individuals of other species of the Red Oak group assume a similar autumn coloring.

Today I relocated the trees found in 1921, and also found many others. The locality is along the margins of the low hills of Tertiary clays and gravel that border the Black River valley in the western suburbs of the town. Most of the trees are well loaded with fruit this year; the leaves are generally of a brilliant crimson color, varying somewhat in shade on different trees. An examination of the fruit, together with the leaves and the winter buds, which are now well developed, can leave no doubt as to the identity of these trees. The commonest form here seems to be the variety in which the scales of the fruiting cup are much thickened at their bases and somewhat indurated, giving the cup a very rough tubercled appearance and a firm polished surface, as though the whole

were carved from hard wood; this is *Quercus coccinea* var. *tuberculata* Sarg. On some trees the cup scales are looser and slightly puberulent, as in the typical form of the eastern states. The winter buds are rather large, full and rounded at the apex, with scales finely puberulent at their tips.

It is interesting to note that Mr. B. F. Bush appears to have also found a tree of this species, a short time ago, near Montier, Shannon County. I have seen specimens of fruit and leaves from this tree, and there can scarcely be any doubt that it is *Quercus coccinea*. There are also two specimens in the herbarium of the Arnold Arboretum, collected by Mr. J. H. Kellogg, near Jerome, Phelps County, which have been referred to this species. This seems to definitely establish the fact that the Scarlet Oak is found in Missouri, although it appears to be a comparatively rare species and, so far as we know now, confined to a few localities in the southern and southeastern parts of the state.

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM[1]

ALFRED REHDER

Cedrus libanotica Link, Handb. II. 480 (1831).

Cedrus libanitica Trew apud Pilger in Engler & Prantl, Nat. Pflanzenfam. ed. 2, XIII. 329 (1926).

The complete synonymy of this species will be found on p. 205 of the preceding volume of this Journal with the exception of the name now taken up by Pilger. I can, however, not follow Pilger in considering the name *C. libanitica* Trew a valid binomial. Trew's book "Cedrorum Libani historia of 1757" is nomenclatorially a prelinnean publication; he does not use binomial nomenclature and even when he cites (p. 7) from Linnaeus' Species plantarum he omits the "nomen triviale" and cites "Pinus foliis fasciculatis acutis Linn. Sp. pl. 1001, n. 6," which clearly shows that he has no intention to use binomials. Also, when he enumerates (p. 7–8) the Conifers he examined and compared with Cedrus, he cites: Larix folio deciduo conifera, Abies Taxifolio sursum spectante, etc. The binomial credited to him by Pilger is contained in a sentence on p. 4, which reads: "Tab. prior Cedri Libaniticae totus habitus secundum unam ex Chelseanis maioribus delineatus." It is evident that this is only a coloquial designation for the Cedar of Lebanon and not intended as a name proposed for this tree. He does not mention this name, on page 4 and 5 where he enumerates all the names applied to the Cedar of Lebanon with references to literature, nor does he use this name anywhere else in his treatise. Such accidental binomials in publication by authors who did not accept binomial nomenclature have been rejected in other cases, as e. g., the name *Alnus*

[1] Contined from vol. VII. p. 37.

vulgaris which was used in 1756 by Hill in his British Herbal, a work in which Hill had not yet adopted binomial nomenclature; this name is therefore to be considered as belonging to prelinnean nomenclature and should not replace *A. glutinosa* (L.) Gaertn. of 1790 (*Betula glutinosa* L. of 1759).

× **Corylus Vilmorinii** (*C. avellana* × *chinensis*), hybr. nov.

Arbor pyramidalis trunco fere ad basin diviso (semper?) ramis erecto-patentibus; ramuli pubescentes, plus minusve glanduloso-setosi, rubro-fusci, vetustiores fusci vel cinereo-brunnei. Folia obovata vel late elliptica, 5–13 cm. longa et 3–9 cm. lata, vix inaequilatera, subito breviter acuminata, basi cordata vel subcordata, duplicato-serrata, vix vel leviter lobulata, supra laxe pubescentia, subtus molliter pubescentia; petioli 0.5–2.5 cm. longi, pubescentes, pilosi et glanduloso-setosi. Amenta mascula 2–4 in ramulis 1–3 cm. longis, ad 9 cm. longa, bracteis conspicue acuminulatis mucrone glabrescente. Fructus 2–6 aggregati; involucrum pubescens et glanduloso-setosum, nucem superans, tubulosum, sed interdum uno latere ad basin vel ad medium fissum, supra nucem vix vel leviter constrictum, 2.5–3 cm. longum, triente superiore vel fere ad mediam in lobos dentatos vel laciniatos suberectos fissum, parte tubulosa nucem subaequante; nux subglobosa, circiter 1.5 diam., interdum paullulo altior quam lata, hilo carpico tertiam vel vix tertiam partem nucis aequante, pericarpio 1.5–2 mm. crasso.

Cultivated at the Arnold Arboretum under no. 7549 (received as plant from M. de Vilmorin in 1911 under no. 1200); specimens in herbarium: September 1919, August 18, 1921, April 7, 1922, September 23, 1925.

This tree received from M. de Vilmorin as a plant in 1911 under the name *Corylus chinensis* and under number 1200 was apparently raised from seed of the tree numbered 1200 in Vilmorin's Frutictum at Les Barres. From this tree I collected myself in September, 1911, fruiting specimens which show clearly that it is true *C. chinensis* Franch. The tree, however, in this Arboretum, supposed to be the same, though resembling *C. chinensis* in habit and also somewhat in foliage, differs considerably in its fruits which exhibit characters pointing to the influence of *C. Avellana* L.; also the other characters of the plant confirm this supposition and leave little doubt that the tree represents a hybrid between *C. chinensis* and probably *C. Avellana*. The influence of *C. Avellana* is indicated by the smaller, broader, more sharply serrate leaves; less unequal at base and more abruptly acuminate, by the shorter tube of the involucre, little constricted above the nut and occasionally split to the base, and with longer more laciniate and dentate lobes, and by the larger and higher nut with a smaller shield and thinner shell. Though there is no proof that *C. Avellana* is the other parent, the short occasionally split tube of the involucre indicates that the second parent could not have been a species with a tubular involucre; the size, shape and the thin walls of the nut exclude *C. Colurna* L. and the involucre in its shape, dentation and

size has little resemblance to that of *C. americana* Walt. and *C. heterophylla* Fisch. which are apparently the only other species that might be considered, but it agrees much more with that of *C. Avellana*. For this reason I accept *C. Avellana* as the other parent, until the contrary is proved by experiment.

× **Corylus spinescens** (*C. avellana* × *tibetica*), hybr. nov.

Frutex ramis erectis; ramuli hornotini rubro-fusci, minute et sparse pilosi vel fere glabri, annotini et vetustiores fusco- vel purpureo-brunnei, luciduli, lenticellis conspicuis pallidis notati; gemmae ovatae, perulis glabris vel minute puberulis tenuiter ciliatis. Folia elliptico-obovata, rarius late obovata vel late ovata, 5–10 cm. longa et 2.8–7 cm. lata, subito acuminata, basi subcordata, argute dupliciter serrata dentibus acuminulatis in ramis robustioribus saepe leviter lobulatis, matura costa venisque subtus sparse pilosis exceptis glabra; petioli 5–15 mm. longi, sparse pilosi et interdum stipitato-glandulosi vel subglabri. Amenta mascula sub anthesi 5–6 cm. longa, bracteis fuscis subito acuminatis satis dense pubescentibus ciliolatis apice glabrescentia. Fructus involucrum puberulum ad basin bipartitum, nucem vix superans, ad medium in lobos angustos laciniato-pinnatifidos laciniis linearibus vel subulatis rigidis spinosis fissum, in facie setis partim glanduliferis partim spinescentibus conspersum; nux subglobosa leviter compressa, circiter 1.5 cm. diam., paullulo latior quam alta.

Cultivated at the Arnold Arboretum under no. 19210 (plant received in 1911 from M. L. de Vilmorin); specimens in herbarium: December 5, 1921, March 6, 1922, September 23, 1925.

This Hazel had passed for *Corylus tibetica* which it resembles in general appearance until it bore fruit last autumn, when it became apparent that it was not true *C. tibetica* Batal. A closer examination showed that it was clearly intermediate between that species and *C. Avellana* L. and apparently a hybrid between these two species raised from seed gathered from a plant of *C. tibetica* in M. de Vilmorin's Fruticetum at Les Bares, France, whence our plant was received in 1911. From *C. tibetica* it differs in the leaves being smaller and, particularly those of vigorous shoots, broader and slightly lobulate with less elongated teeth, in the shorter petioles slightly pubescent and often stipitate-glandular, and in the involucre of the fruit which is not densely covered by long much-branched spines, resembling the burr of a chestnut, but is more like that of *C. Avellana* except that the ultimate divisions of the involucre end in rigid spiny points with additional spiny or partly gland-bearing bristles on the face of the involucre. From the latter species it further differs in the glabrescent and, particularly on the fruiting branches, narrower more or less elliptic leaves with closer and sharper serrations, in the dark red-brown branches with conspicuous pale lenticels and in the more acuminate scales of the staminate aments with glabrescent brown tips.

The plant in this Arboretum is a vigorous rather dense shrub now about 3 m. tall with upright branches and brighter and handsomer foliage than that of the common Hazel.

× **Clematis vedrariensis** var. **rosea**, comb. nov. (*C. chrysocoma* var. *sericea* × *montana* var. *rubens*).

Clematis Spooneri rosea Mottet in Rev. Hort. 1922, 214, t.; Arb. Arbust. d'Orn. 27 (1925).

This handsome Clematis which is according to Mottet a hybrid between *C. Spooneri* Rehd. & Wils. and *C. montana rubens* Ktze. raised in Vilmorin's nursery at Verrières, resembles in size and shape of its flowers the first named parent but differs in their rosy color. As I am following Schneider in reducing *C. Spooneri* to a variety of *C. chrysocoma* Franch. as *C. chrysocoma* var. *sericea* (Franch.) Schneid., this hybrid has to be classed with the hybrids between *C. chrysocoma* Franch. and *C. montana* for which the binomial is *C. vedrariensis* Hort. Vilmorin in Jour. Soc. Hort. France, ser. 4, XV. 385 (July, 1914) (*C. verrieriensis* Hort. Vilm. apud Gard. Chron. ser. 3, LV. 393, fig. 179 [June 6, 1914], without sufficient description). Though *C. verrieriensis* has priority by several weeks, I have adopted *C. vedrariensis*, as the latter name is accompanied by a full and detailed description, while the name *C. verrieriensis* was published without adequate description and with a very indifferent figure.

Ribes echinellum, comb. nov.

Grossularia echinella Coville in Jour. Agric. Research, XXVIII. 71, t. 1 (1925).

FLORIDA.

As we do not consider Grossularia Adans. generically distinct from Ribes L., the new combination cited above becomes necessary. Through the courtesy of Dr. Coville this Arboretum has received herbarium specimens of this interesting new Gooseberry and also seeds from which plants were raised. How far north *R. echinellum* will be hardy remains to be tested, but it is to be expected that it will prove hardy much further north than its present distribution indicates, as Ribes and particularly the subgenus Grossularia is essentially a northern group.

\+ **Pyronia Danieli,** comb. nov. (*Cydonia oblonga* + *Pyrus communis*).

Pirocydonia Danieli Hans Winkler apud L. Daniel in Compt. Rend. Acad. Sci. Paris, CLVII. 995 (1913); in Rev. Gén. Bot. XXVI. 312 (1914).

Pyro-Cydonia Danieli Guillaumin in Bull. Soc. Dendr. France, 1925, 63, t., fig. 4.

As I have stated already in this Journal (I. 262 [1919]) I am in favor of placing all forms intermediate between two distinct genera whether of sexual or asexual origin under one generic name. I see no advantage in segregating sexual hybrids and graft-hybrids between the same genera and in some cases even between the very same species under different generic names, though it seems advisable to distinguish sexual hybrids and graft-hybrids between the same species by different binomials. To indicate by convenient signs the origin, whether sexual or asexual, I propose to use the customary sign "×" for sexual hybrids and the sign "+" for graft hybrids.

The names Pyronia and Pyrocydonia have been coined for hybrids between the same species, namely *Cydonia oblonga* Mill. and *Pyrus communis* L.: Pyronia for the sexual hybrid, Pyrocydonia for the graft-hybrid.

As Pyronia Veitch was published first in 1911[1] while Pirocydonia Hans Winkler was not published until 1913[2] by L. Daniel, the latter should be considered a synonym of Pyronia. Under Pyronia there will be two binomials: *P. Veitchii* Guillaumin (in Bull. Soc. Dendr. France, 1925, p. 64) and *P. Danieli;* the former as the name for the sexual hybrids and the latter as the name for the graft-hybrids between *Cydonia oblonga* and *Pyrus communis.*

Another form of *P. Danieli* is the following:

\+ **Pyronia Danieli** var. **Winkleri,** comb. nov.

Pyro-Cydonia Winkleri Daniel in Bull. Soc. Dendr. France, 1925, 63, t. fig. 5.

This form was obtained in 1913 by L. Daniel from the burr of an old tree of the Pear "Bon chrétien Williams" grafted on Quince; it differs from the original form obtained in 1902 in its smaller more pubescent leaves, conduplicate in bud, in the shorter petiole and in the fact that it grows readily from cuttings.

This and the preceding plant as well as *Pyronia Veitchii* var. *luxemburgiana* Guillaumin are represented in this Arboretum by young grafted plants.

Wistaria macrostachya Nutt. f. **albo-lilacina,** f. nov.

Wistaria frutescens c. *albo-lilacina* Dippel, Handb. Laubholzk. III. 694.(1893).
Wistaria frutescens rosea Hort. nonn. ex Dippel, l. c., as synon.

This Wistaria is enumerated by Dippel as a variety of *Wistaria frutescens,* but the plant cultivated at this Arboretum under this name is evidently a form of *W. macrostachya* Nutt. with pale lilac flowers.

Opuntia rhodantha var. **xanthostemma,** comb. nov.

Opuntia xanthostemma K. Schumann in Monatschr. Kakteenk. VI. 111 (1896); Spaeth Kat. no. 98, p. 58 (1896) without adequate description; Gesammtbeschreib. Kakt. 735 (1898).—Rehnelt in Gartenwelt I. 90, fig. (p. 83) (1896).—F. W. Meyer in Garden, LVIII. 67, fig. (1900).—E. Wagner in Monatschr. Kakteenk. XXX. 153, fig. (1920).—Nussbaumer in Gartenschönh. IV. 123, fig. (1923).

This variety differs chiefly in its yellow filaments from the typical *O. rhodantha* K. Schum. which has carmine-red filaments and of which a colored plate was published in 1897 in Spaeth's Katalog, no. 100.

[1] Proc. Roy. Hort. Soc. XXXVII. p. xxxii (1911); XXXVIII. p. xxxiv. (1912); XL. p. clxxviii (1914).

[2] Compt. Rend. Acad. Sci. Paris, CLVII. 995 (1913). Through the kindness of Dr. Mansfeld in Berlin I received a note sent to him by Dr. Hans Winkler in which he states that he first proposed the name *Pirocydonia Danieli* in a letter written to Professor L. Daniel in 1913.

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ENUMERATION OF THE LIGNEOUS PLANTS OF NORTHERN CHINA, III[1]

ALFRED REHDER

(*Plate 2*)

LEGUMINOSAE TO SAPINDACEAE

LEGUMINOSAE

Albizzia julibrissin Durazzini in Mag. Tosc. III. pt. IV. 11 (1772).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 147 (Fl. Tché-foû, 52) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 254 (Pl. David. I. 102) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 216 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 53 (1898).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Harms in Bot. Jahrb. XXIX. 409 (1900); XXXIV. beibl. LXXV. 41 (1904).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 137 (1919).—Bailey, Gent. Herb. I. 31 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 2 (1922).

Acacia nemu Willdenow, Spec. IV .1065 (1806).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 95 (Enum. Pl. Chin. Bor. 21) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).

CHILI: Peking, *C. A. Skatschkoff*, about 1850 (Gray Herb.), cultivated, *C. S. Sargent*, Sept. 18, 1903; Ch'a tao, J. *Hers*, no. 1542, July 23, 1921.—See also Franchet, l. c. (1883), Hemsley, l. c., Bretschneider, l. c., Bunge, l. c., Maximowicz, l. c.

SHANTUNG: Tientsin, *F. N. Meyer*, no. 1001, June 12, 1913; *H. H. Chung*, no. 47, October 3, 1920.—See also Debeaux, l. c., Franchet, l. c. (1884), Faber, l. c., Harms, l. c. (1904), and Harms & Loesener, l. c.

HONAN: Chi kung shan, Hupeh border, *L. H. Bailey*, June 30, 1917.—See also Bailey, l. c., and Hers, l. c.

SHENSI: Sian fu plain, *W. Purdom*, no. 959, in 1910.—See also Harms, l. c. (1900).

DISTRIBUTION: also Persia to Japan, the Philippine Islands and the Himalayas; much planted in all tropical and subtropical countries.

[1] For Part II, see Vol. V, p. 137.

Albizzia kalkora Prain in Jour. As. Soc. Bengal, LXVI. 511 (1897); Novic. Ind. 345 (1905).—Schneider in Sargent, Pl. Wilson. III. 446 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan. Sept. 2 (1922).—Chung in Mem. Sci. Soc. China, I. 105 (Cat. Trees Shrubs China) (1924).

Acacia macrophylla Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II, 135 (Enum. Pl. Chin. Bor. 61) (1863).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).

Albizzia Lebbeck Hemsley in Jour. Linn. Soc. XXIII. 216 (1887), pro parte.—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Harms in Bot. Jahrb. XXIX. 408 (1900); XXXIV. beibl. LXXV. 41 (1904).— Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 137 (1919).—? Bailey, Gent. Herb. I. 31 (1922).—Non Bentham.

Acacia Lebbeck Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).—Non Willdenow.

Albizzia sp. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XIV. 29 no. 21969 (1909).

CHILI: near Peking (ex Bunge, l. c.).—See also Chung, l. c., Maximowize, l. c., and Bretschneider, l. c.

SHANTUNG: Chifu, in garden, *C. S. Sargent*, September 22, 1903; Chifu, *N. H. Cowdry*, no. 558, June, 1920; Boshan, *F. N. Meyer*, no. 257, September, 1907; Tsingtau, *R. Zimmermann*, no. 211, in 1901.—See also Harms, l. c. (1904), Faber, l. c., Harms & Loesener, l. c., Bretschneider, l. c., Meyer, l. c., and Chung l. c.

HONAN: Sung Hsien, Manyu, alt. 900 m., *J. Hers*, no. 116, October 8, 1919; Teng feng hsien, Yu tai shan, alt. 500 m., *J. Hers*, no. 266, June 17, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2660, August 22, 1923; Tsi yuan hsien, Pei ting shan, *J. Hers*, no. 2802, October 10, 1923; Cheng chow, planted (introduced from the hills), *J. Hers*, no. 2884, May 25, 1924. Without precise locality *J. Hers* no. 12 in 1918.—See also Hers, l. c., Bailey, l. c., and Chung, l. c.

NORTHERN KIANGSU: Siao hsien, Huang tsang yu, *J. Hers*, no. 1047, May 26, 1919; Suchow fu, Huang tsang yu, *J. Hers*, nos. 1073, 2811, November 1, 1919 and October 15, 1923.

SHENSI: Tai pei shan, *G. Giraldi*, no. 1607 (ex Harms, l. c.).

DISTRIBUTION: also Hupeh, Kiangsi, Hunan, Fukien, to Khasia and Naga Hills.

Cercis chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 95 (Enum. Pl. Chin. Bor. 21) (1833).—Hemsley in Jour. Linn. Soc. XXIII. 213 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Harms in Bot. Jahrb. XXIX. 409 (1900); XXXIV. beibl. LXXV. 41 (1904).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 138 (1919).—Hers in Jour. N. China Branch. R. As. Soc. LIII. 108 (1902); Liste Ess. Lign. Honan Sept. 7 (1922).—Chung in Mem. Sci. Soc. China, I. 106 (Cat. Trees Shrubs China) (1924).

CHILI: cultivated in Peking (ex Bunge, l. c.).—See also Bretschneider, l. c., and Chung, l. c.

HONAN: Teng feng, Yu tai shan, alt. 800 m., *J. Hers*, no. 291, June 17, 1919; Yung ning, Tsi li ping, alt. 1100 m., *J. Hers*, no. 404, May 22, 1919; Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 525, May 24, 1919; Sung hsien, Shih tze miao, *J. Hers*, no. 579, May 26, 1919.—See also Hers, l. c., and Chung, l. c.

SHANTUNG: in villages near Tsing tau (cultivated?) (ex Harms, l. c. (1904), and Harms & Loesener, l. c.).—See also Faber, l. c., Harms, l. c., Harms & Loesener, l. c., and Chung, l. c.

SHENSI: Thui kio tseun, *G. Giraldi*, September 25, 1897; Meng kia yuan, alt. 850 m., *J. Hers*, no. 2443, October 10, 1922; Hua shan, alt. 500–1000 m., *J. Hers*, no. 3042, October 31, 1924.—See also Harms, l. c. (1900), and Chung, l. c.

KANSU: Yu yin chen, alt. 900 m., *F. N. Meyer*, no. 1953, September 25, 1914; Fu orr yei, alt. 1300 m., *F. N. Meyer*, no. 1642, October 7, 1914.—See also Chung, l. c.

DISTRIBUTION: also Kiangsu, Anhwei, Fukien, Hupeh, Szechuan, Kweichou.

Bauhinia Faberi Oliver in Hooker's Icon. XVIII. t. 1790 (1888).—Farrer in Jour. Roy. Hort. Soc. XLII. 61 (1916).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 69, no. 40708 (1918).

KANSU: near Chieh chow *F. N. Meyer*, no. 1797, October 10, 1914, (Herb. U. S. Dept. Agric.).—See also Farrer, l. c., and Meyer, l. c.

DISTRIBUTION: also Szechuan and Hupeh.

Cassia mimosoides Linnaeus, Spec. 379 (1753).

This species and also *C. occidentalis* L. which both occur in northern China are sometimes enumerated as woody plants but they are annuals or short-lived perennials somewhat woody only at base; they are widely distributed weeds of tropical and subtropical countries.

Gleditsia horrida Makino in Tokyo Bot. Mag. XVII. 12 (1903).—Chung in Mem. Sci. Soc. China, I. 107 (Cat. Trees Shrubs China) (1924).

Gleditsia japonica Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 54 (1867); Prol. Fl. Jap. 242 (1867).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 138 (1919).

? *Gymnocladus Williamsii* Hance in Jour. Bot. XXII. 336 (1884).

? *Gleditschia* Faber in Denkschr. Entwick. Kiautschou, 33 (1898).

CHILI: Po hua shan, *J. Hers*, no. 1410, May 1, 1921 (flowers).—See also Hance, l. c.

SHANTUNG: near Chifu, *C. S. Sargent*, September 22, 1903 (fruit).—See also Loesener, l. c., and Chung, l. c.

NORTHERN KIANGSU: Suchow fu, Huang tsang yu, *J. Hers*, no. 1074, November 1, 1919.

DISTRIBUTION: also Japan and Korea.

I have seen no fruiting specimens from Chili and do not feel absolutely sure that Hers' no. 1410 which is in flower belongs here, but it agrees in its leaf characters with this species, while his no. 1415 collected in the

same locality and likewise in flower, apparently belongs to the following species. *Gymnocladus Williamsii* according to the description seems to belong here rather than to *G. sinensis* where it was placed by Hemsley.

Gleditsia sinensis Lamarck, Encycl. Méth. II. 465 (1786).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 95 (Enum. Pl. Chin. Bor. 21) (1833).—Turczaninow in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowez in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XXX. 38 (1886); in Mél. Biol. XII. 453 (1886).—David, Jour. Trois. Voy. Emp. Chin. I. 94 (1875).—Hemsley in Jour. Linn. Soc. XXIII. 209 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 49, 52, 451, 849 (1898).—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XIV. 50, no. 22376 (1909); XXXV. 60, no. 35616 (1915).—Bailey, Gent. Herb. I. 31 (1920).—Hers, in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan Sept. 14 (1922).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 415 (1922).—Chung in Mem. Sci. Soc. China, I. 107 (Cat. Trees Shrubs China) (1924).

Gleditschia xylocarpa Hance in Jour. Bot. XXII. 366 (1884).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXXI. 39 (1886); in Mél. Biol. XII. 453 (1886).

CHILI: near Ying tau ko, *F. N. Meyer*, no. 1301, September 13, 1913; Men tow kow, *N. H. Condry*, no. 488, June 8, 1920; Po hua shan, *J. Hers*, no. 1415, May 1, 1921.—See also Maximowicz, l. c., Bretschneider, l. c., Meyer, l. c., and Limpricht, l. c.

SHANTUNG: Tsi nan fu, *F. N. Meyer*, in 1913 (fruits only).—See also Meyer, l. c., and Chung, l. c.

HONAN: Tze kien, alt. 600 m., *J. Hers*, nos. 71–75, October 1, 1919; Sung hsien, San kuan miao, *J. Hers*, no. 513, May 24, 1919; Kio shan, *L. H. Bailey*, June 22, 1917.—See also David, l. c., Bretschneider, l. c. 849, Bailey, l. c., Hers, l. c., and Chung, l. c.

SHENSI: *P. J. Piasezki* (ex Maximowicz, l. c.), and *G. Giraldi* (ex Harms, l. c.).

DISTRIBUTION: also Chekiang and Szechuan.

This species differs from the preceding in the shorter straight or only slightly curved, not twisted, thicker pods with woody walls and in the generally fewer firmer leaflets distinctly reticulate beneath. *Gleditsia macracantha* Desf. with which it has been sometimes confused is distinguished by the pubescent ovary and the larger leaflets.

Gleditsia heterophylla Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 95 (Enum. Pl. Chin. Bor. 21) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 471 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XXXI. 40 (1886); in Mél. Biol. XII. 453 (1886).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 254 (Pl. David I. 102) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour.

Linn. Soc. XXIII. 209 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).—Hers. in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan Sept. 14 (1922).

Gleditsia sp. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XIV. 50, no. 22377 (1909).

CHILI: Po hua shan, *J. Hers*, nos. 1683, 1684, September 9, 1921.—See also Bunge, l. c., Turczaninow, l. c., Maximowicz, l. c., Franchet, l. c. (1883), Bretschneider, l. c., Hemsley, l. c. and Meyer, l. c.

SHANTUNG: near Tsing tau, *F. N. Meyer*, no. 245, September, 1907; Lung tung, *F. N. Meyer*, no. 246, September 25, 1907.—See also Franchet, l. c. (1884).

HONAN: Kung hsien, *J. Hers*, nos. 49, 50, June 1, 1919; Tze kien, extremely common in the loess region between alt. 100-600 m., *J. Hers*, no. 76, October 1, 1919; Hwei hsien, Ta fu sze, *J. Hers*, no. 777, June 16, 1919.—See also Hers, l. c.

DISTRIBUTION: endemic.

Caesalpinia sepiaria Roxburgh, Fl. Ind. II. 360 (1824).—Hemsley in Jour. Linn. Soc. XXIII. 206 (1887).—Harms in Bot. Jahrb. XXIX. 410 (1900); XXXVI. beibl. LXXXII. 57 (1905).

Caesalpinia sp. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XV. 52, no. 22980 (1909).

NORTHERN KIANGSU: Suchow, *F. N. Meyer*, no. 337, April 26, 1908 (seeds; plants raised from this seed cultivated in Chico, Calif.).

HONAN: Hwang shan po and Likia chai, *J. Hers*, no. 1601, May 1, 1920.

SHENSI: *P. J. Piasezki* (ex Hemsley, l. c., and Harms, l. c. [1900]) and *G. Giraldi* (ex Harms, l. c. [1905]).

DISTRIBUTION: Tropical Asia; naturalized in tropical Africa, America, Hawaii and probably elsewhere.

Sophora japonica Linnaeus, Mant. I. 68 (1767).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Debeaux in Act. Soc. Linn. Bordeaux, XXXIII. 39 (Fl. Tien-tsin, 16) (1879).—Hemsley in Jour. Linn. Soc. XXIII. 202 (1887).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 48, 158, 167, 226, 227, 451 (1898).—Kanitz in Szechenyi, Keletazs. Utján. Tudom Ered. II. 1806 (Pl. Enum. 19) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 695 (1898).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 138 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan Sept. 29 (1922).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 416 (1922).—Chung in Mem. Sci. Soc. China, I. 109 (Cat. Trees Shrubs China) (1924).

CHILI: Temple of Confucius, *C. S. Sargent*, September 15, 1903; San tun ying, *F. N. Meyer*, no. 963, May 29, 1913; Peking, Temple of Heaven,

J. Hers, nos. 1948 1955, August 13, 1922; Peking, own garden, *J. Hers*, nos. 1956 1959, August 13, 1922; Feng tai near Peking, *J. Hers*, nos. 1960–1963, 1965 1969, 1976, 1978, August 13, and 18, 1922.—See also Bunge, l. c., Maximowicz, l. c., Debeaux, l. c., Bretschneider, l. c., Hemsley, l. c., Limpricht, l. c., and Chung, l. c.

SHANTUNG: *G. L. Staunton* (ex Hemsley, l. c.).—See also Faber, l. c., and Harms & Loesener, l. c.

HONAN: Cheng chow, *J. Hers*, nos. 1934 1945, July 20, 1922; Kwan yin tang, alt. 600 m., *J. Hers*, nos. 1985, 1986, 1989, August 26, 1922; Kwei teh, *J. Hers*, no. 1988, August 28, 1922.—See also Hers, l. c.

KANSU: near "Czing-csou," *L. Loczy* (ex Kanitz, l. c.); *P. J. Piasezki* (ex Hemsley, l. c.).—See also Chung, l. c.

DISTRIBUTION: throughout China; also in Korea; planted in Japan.

According to Mr. J. Hers the Chinese distinguish three kinds of *S. japonica* according to the color of the wood: the pai kuai or white Sophora, the tow tsing kuai or bean-green Sophora and the hei kuai or black Sophora. The white form gives the best wood, the black the least valuable (See vol. III. 34 of this Journal). The herbarium specimen from trees of these three forms do not show the slightest difference, but it may be mentioned that the specimens representing the var. *pubescens* Bosse all belong to the white Sophora.

Sophora japonica f. **pendula** Hort. apud Loudon, Arb. Brit. II. 564 (1838), as [var.]—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 807 (Pl. Enum. 19) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 695 (1898), as γ. —Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan Sept. 29 (1922).

HONAN: cultivated (ex Hers, l. c.).

KANSU: cultivated ? (ex Kanitz, l. c.).

DISTRIBUTION: planted occasionally in other provinces of China.

Sophora japonica f. **oligophylla** Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 25 (Pl. David. I. 100) (1883), as var.

CHILI: near Peking, *A. David* (ex Franchet, l. c.).

HONAN: Cheng chow, *J. Hers*, no. 1947, July 20, 1922.

I have little doubt that Hers' no. 1947 is identical with Franchet's variety which is apparently a monstrous garden form. The leaves have only 3–5 crowded leaflets of unequal size and irregular shape, the middle leaflets often 3-lobed and the lateral ones often with a large lobe on the lower side; the upper surface is minutely pubescent and the lower surface covered with accumbent villose hairs pilose on the veins, as in var. *pubescens*.

Sophora japonica var. **pubescens** Bosse, Vollst. Handb. Blumengärt. ed. 2, III. 408 (1842), as γ.—Rehder in Jour. Arnold Arb. III. 32 (1921).

CHILI: Peking, *S. W. Williams*, August 1876 (Gray Herb.); Fengtai near Peking, *J. Hers*, nos. 1975, 1977, August 18, 1922.

HONAN: Cheng chow, *J. Hers*, no. 1946, July 20, 1922.

DISTRIBUTION: also Kiangsu, Hupeh, Szechuan; Korea.

Of *S. japonica* var. *violacea* Carrière I have seen no specimens from China; it differs from the typical form in the flowers having the wings and keel tinged purplish and, at least in the cultivated plant, appearing later than those of the typical form.

Sophora viciifolia Hance in Jour. Bot. XIX. 209 (1881).—Hooker f. in Bot. Mag. CXXIX. t. 7883 (1903).—Farrer in Jour. Roy. Hort. Soc. XLII. 111 (1916).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 69, no. 40707 (1918).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan Sept. 29 (1922).—Chung in Mem. Sci. Soc. China, I. 109 (Cat. Trees Shrubs China) (1924).

Sophora Moorcroftiana var *Davidi* Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 253, t. 14 (Pl. David. I. 101) (1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 860 (1898).

Sophora Moorcroftiana Kanitz in Math.-Naturwiss. Ber. Ungarn, III. 7 (1885); in Szechenyi, Kelatazs. Utján. Tudom. Ered. II. 806 (Pl. Enum. 19) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 695 (1898).—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).

Caragana chamlagu ? Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XIV. 29, no. 21967 (1909).

CHILI: Peking, purchased from a flower vender, *F. N. Meyer*, no. 924, May 10, 1913.—See also Chung. l. c.

SHANTUNG: Chinan fu, *F. N. Meyer*, nos. 250, 259, September 22, 1907 (Gray Herb.).

HONAN: Kung hsien, alt. 300 m., *J. Hers*, no. 285, June 15, 1919; Hwei hsien, Shansi border, *J. Hers*, no. 714, June 19, 1919.—See also Hers, l. c., and Chung, l. c.

SHANSI: Chin yuan, alt. 1100 m., *K. Ling*, Herb. Univ. Nanking no. 9159, July 4, 1925; near Lui chen, *F. N. Meyer*, no. 1874, November 7, 1914. (Herb. U. S. Dept. Agric.).—See also Meyer, l. c.

SHENSI: Yenan fu, *W. Purdom*, no. 1125, in 1910; near Tchan lien li, *F. N. Meyer*, no. 1928, September 17, 1914 (Herb. U. S. Dept. Agric.).—See also Franchet, l. c., Bretschneider, l. c., Harms, l. c., and Chung l. c.

KANSU: Tsing chow, Cheng kia chuang, alt. 1600 m., *J. Hers*, no. 2433, October 6, 1922.—See also Farrer, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Sophora flavescens Aiton, Hort. Kew. II. 43 (1789).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Turczaninow in Bull. Soc. Nat. Moscou, X. no. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 252 (Pl. David. I. 100) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. (1884).—Kanitz in Math.-Naturwiss. Ber. Ungarn. III. 8 (1886); in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 806 (Pl. Enum. 19) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 695 (1898).—Hemsley in

Jour. Linn. Soc. XXIII. 202 (1887). Bretschneider, Hist. Eur. Bot. Discov. China, 53 (1898).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Harms in Bot. Jahrb. XXIX. 410 (1900).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 138 (1919).—Limpricht in Bot. Reis. Hochgeb. Chin. Ost.-Tib. 415 (1922).—Chung in Mem. Sci. Soc. China, I. 109 (Cat. Trees Shrubs China) (1924).

Sophora galegoides Pallas, Spec. Astragal. 118, t. 88 (1800). -Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 136 (Fl. Tché-foû, 41) (1876).

CHILI: Hsiao Wu tai shan, *F. N. Meyer*, no. 1329, August 23, 1913; Po hua shan, *J. Hers*, no. 1440, July 1, 1921.—See also Bunge, l. c., Turczaninow, l. c., Maximowiez, l. c., Hemsley, l. c., Bretschneider, l. c., Limpricht, l. c., and Chung, l. c.

SHANGTUNG: Tsingtau, *R. Zimmermann*, no. 201, in 1901 (Gray Herb.). – See also Debeaux, l. c., Hemsley, l. c., Faber, l. c., Harms & Loesener, l. c., and Chung, l. c.

SHENSI: See Harms, l. c., and Chung, l. c.

KANSU: See Hemsley, l. c., and Kanitz, l. c.

DISTRIBUTION: also Kiangsi, Fukien, Kwangtung, Hupeh, Szechuan, Yunnan.

This species though not truly ligneous, is more or less suffruticose and therefore has been included in this enumeration, but *S. alopecuroides* L. and *S. pachycarpa* C. A. Mey. both occurring in northern China are herbaceous.

Maackia amurensis Ruprecht & Maximowiez in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 128, 143, t. (1856). Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 58 (1905).

Cladrastis amurensis K. Koch, Dendr. I. 7 (1869).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 138 (1919).

SHANTUNG: (ex Harms & Loesener, l. c.).

SHENSI: *G. Giraldi*, nos. 635, 1032 (ex Harms, l. c.).

DISTRIBUTION: Manchuria.

I have seen no specimen from Shantung and Shensi and I suspect that these plants may prove to be identical with one of the two following species.

Maackia chinensis Takeda in Not. Bot. Gard. Edinb. VIII. 103 (1913).

Maackia hupehensis Takeda in Sargent, Pl. Wilson. II. 98 (1914).

NORTHERN KIANGSU: Liu lin-shan, near Haichow, *J. Hers*, no 651,. May 5, 1921.

DISTRIBUTION: also Kiangsi, Hupeh, Szechuan.

The specimen consists only of a branch with young shoots just unfolding, but it agrees in its pubescence exactly with the young growth of Wilson's no. 709, the type number of this species.

Maackia honanensis Bailey, Gent. Herb. I. 32, fig. 9. (1920).

HONAN: Chi kung shan (ex Bailey, l. c.).

DISTRIBUTION: also Kiangsu.

The species is represented in this herbarium only by a flowering specimen from Bau hwa shan, Kiangsu, collected by A. N. Steward (Univ. Nanking Herb. no. 5200).

Cladrastis Wilsonii Takeda in Not. Bot. Gard. Edinb. VIII. 103 (1913); in Sargent, Pl. Wilson. II. 97 (1916).—Hers in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan Sept. 8 (1922).—Chung in Mem. Sci. Soc. China, I. 109 (Cat. Trees Shrubs China) (1924).

HONAN: Lushi, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 877, October 10, 1919.—See also Hers, l. c.

SHENSI: Shan hsien li, alt. 1200 m., *F. N. Meyer*, no. 1930, September 17, 1914.—See also Chung, l. c.

DISTRIBUTION: also Kiangsi, Hupeh, Hunan, Szechuan.

Both specimens cited consist of sterile branches; the Honan specimen resembles in its narrower and more numerous (9-13) leaflets *C. sinensis* Hemsl., but the leaflets are quite glabrous beneath and distinctly acuminate.

Indigofera Kirilowii Maximowicz apud Palibin in Act. Hort. Petrop. XIV. 114 (1895), nom. nudum; XVII. 62, t. 4 (1899), pro parte.—Craib in Not. Bot. Gard. Edinb. VIII. 66 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan Sept. 15 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 162 (1922).—Chung in Mem. Sci. Soc. China, I. 111 (Cat. Trees Shrub China) (1924).

Indigofera macrostachya Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 90 (Enum. Pl. Chin. Bor. 16) (1833).—Turczaninow in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859); in Bull. Soc. Nat. Moscou, LIV. 8 (1879).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 139 (Fl. Tchéfoû, 44) (1877).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 234 (Pl. David. I. 83) (1883). Hemsley in Jour. Linn. Soc. XXIII. 157 (1886).—Faber in Denkschr. Entwick. Kiautschou, 32 (1898).—Harms in Bot. Jahrb. XXIX. 411 (1900); XXXIV. beibl. LXXV. 43 (1904).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 140 (1919).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 416 (1922).—Non Ventenat.

CHILI: near San tun ying, rocky places, *F. N. Meyer*, no. 968, May 30, 1913; Pei tai ho, rocky hills, *N. H. Cowdry*, no. 170, July 27, 1919; Peking, western Hills, *J. Hers*, no. 2519, June 10, 1923.—See also Bunge, l. c., Turczaninow, l. c., Maximowicz, l. c. (1859), Franchet, l. c., Hemsley, l. c., Palibin, l. c., Craib, l. c., Cowdry, l. c., and Limpricht, l. c.

SHANTUNG: Tsingtau, *R. Zimmermann*, nos. 182, 381, in 1901; Chifu, open places, *N. H. Cowdry*, no. 629, August 9, 1920; Tai shan, *J. Hers*, no. 1926, June 18, 1922. See also Debeaux, l. c., Maximowicz, l. c. (1879), Faber, l. c., Harms, l. c. (1904), Craib, l. c., Harms & Loesener, l. c.

HONAN: Yung ning, Tsi li ping, *J. Hers*, no. 446, May 22, 1919; Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1228, Sept. 22, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1313, September 27, 1919.—See also Hers, l. c.

SHENSI: Tai pei shan, *W. Purdom*, no. 951, in 1910.—See also Harms, l. c. (1900).

DISTRIBUTION: also Manchuria, Korea.

This species is rather variable in the size of the leaves and of the racemes; the leaflets vary from 1.5 cm. in Hers' no. 2519 from Peking to 7 cm. in his no. 1313 from Honan and the racemes may be shorter than the leaves as in Hers 2519 or about twice as long and attaining up to 20 cm. in length as in Zimmermann's no. 182 which probably represents f. *coreana* Craib.

Indigofera Carlesii Craib in Not. Bot. Gard. Edinb. VIII. 48 (1913).—Bailey, Gent. Herb. I. 31 (1920).

HONAN: Kioshan (ex Bailey, l. c.)

DISTRIBUTION: also Kiangsu.

Indigofera pseudotinctoria Matsumura in Tokyo Bot. Mag. XVI. 62 (1902).—Craib in Not. Bot. Gard. Edinb. VIII. 69 (1913).

SHENSI: Mte. Kin tan san, *G. Giraldi*, July 14, 1897.

DISTRIBUTION: also Kiangsu, Kiangsi, Kwantung, Hupeh, Szechuan and Yunnan.

Indigofera Bungeana Walpers in Linnaea, XIII. 525 (1839).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Hance in Jour. Bot. XIII. 131 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 234 (Pl. David. I. 82) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 156 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 53, 331 (1898).—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 58 (1905).—Craib in Not. Bot. Gard. Edinb. VIII. 69 (1913).—Chung in Mem. Sci. Soc. China, I. 110 (Cat. Trees Shrubs China) (1924).

Indigofera micrantha Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 90 (Enum. Pl. Chin. Bor. 16) (1833).—Turczaninow in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Non Desvaux, nec E. Meyer.

Indigofera pseudotinctoria Chung in Mem. Sci. Soc. China, I. 111 (Cat. Trees Shrubs China) (1924), quoad plantam e Chili.—Non Matsumura.

CHILI: Weichang, *W. Purdom*, no. 953, in 1909; Siao Wutai shan, Shui shih tao, alt. 1500 m., *J. Hers*, no. 2182, October 8, 1922; mountains near Y. Chow, *N. H. Coudry*, no. 1771, July 20, 1921; without precise locality, *Père Chanet*, no. 92, in 1919.—See also Bunge, l. c., Turczaninow, l. c., Maximowicz, l. c., Hance, l. c., Franchet, l. c., Hemsley, l. c., Bretschneider, l. c., Craib, l. c., and Chung, l. c.

HONAN: Chang mao, Shan chow, alt. 700 m., *J. Hers*, no. 814, October 2, 1919.

SHENSI: Tai pei shan, *W. Purdom*, no. 1113, in 1910; Lung chow, Li kia po, alt. 1800 m., *J. Hers*, no. 2369, July 4, 1922.—See also Harms, l. c.

KANSU: Tsing chow, Wu shih li pu, alt. 1500 m., *J. Hers*, no. 2412, July 21, 1922.

DISTRIBUTION: endemic.

Indigofera Hosiei Craib in Not. Bot. Gard. Edinb. VIII. 55 (1913).
SHENSI or KANSU: without precise locality, *A. Hosie*, no. 1 (ex Craib, l. c.).
DISTRIBUTION: endemic.

Indigofera Potaninii Craib in Not. Bot. Gard. Edinb. VIII. 60 (1913).—Chung in Mem. Sci. Soc. China, I. 111 (Cat. Trees Shrubs China) (1924), excl. Honan et Shensi.
KANSU: west Kansu, *G. N. Potanin*, in 1885 (ex Craib, l. c.).—See also Chung, l. c.
DISTRIBUTION: endemic.

Indigofera amblyantha Craib in Not. Bot. Gard. Edinb. VIII. 47 (1913).
Indigofera ichangensis Hers in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan Sept. 15 (1922).—Non Craib.
Indigofera Potaninii Hers, l. c.—Chung, in Mem. Sci. Soc. China, I. 111 (Cat. Trees Shrubs China) (1924), quoad Honan et Shensi.—Non Craib.
HONAN: Chi kung shan, *L. H. Bailey*, June 12, 1917: Sia shih, *J. Hers*, no. 350, May 25, 1921; Yung ning, Tsi li ping, *J. Hers*, no. 427, May 22, 1919 and no. 1341, September 30, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 826, October 4, 1919; Lu shi, Kiao ho, alt. 1000 m., *J. Hers*, no. 970, October 13, 1919; Lu shi, Lao kiun shan, *J. Hers*, no. 1144, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1741 and 1899, September 21, 1919; without locality, *J. Hers*, no. 1994; Cheng chow nursery, introduced from Sung shan, *J. Hers*, nos. 334 and 2585, May 1, 1921 and August 2, 1924.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.
SHENSI: northwest of Han cheng hsien, *W. Purdom*, no. 952, in 1910; Tsing ling, 60 km. south of Sian fu, *J. Hers*, no. 2960, October 20, 1924.—See also Chung, l. c.
KANSU: near Hui hsien, *F. N. Meyer*, no. 1956, September 26, 1914.
DISTRIBUTION: also Hupeh.
Purdom's no. 952 from Shensi has somewhat larger flowers than typical *I. amblyantha*, but I can see no other difference and consider it only a variation of this species.

Wistaria sinensis Sweet, Hort. Brit. 121 (1827).—Rehder & Wilson in Pl. Wilson. II. 509 (1916).—Chung in Mem. Sci. Soc. China. I. 112 (Cat. Trees Shrubs China) (1924).
Wistaria chinensis De Candolle, Prodr. II. 390 (1825).—Harms in Bot. Jahrb. XXXIV. beibl. LXXV. 43; XXXVI. beibl. LXXXII. 58 (1905).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 140 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 117 (1922); Liste Ess. Lign. Honan Sept. 34 (1922).
SHANTUNG: villages in the vicinity of Tsing tau, *O. Nebel* (ex Harms, l. c. (1904) and Harms & Loesener, l. c.).—See also Chung, l. c.
HONAN: without locality, cultivated (ex Hers, l. c.).
SHENSI: Lu tun and Kolupa, *G. Giraldi* (ex Harms, l. c. [1905]).
DISTRIBUTION: also Hupeh, Kiangsu, Chekiang, Kwang-tung, Szechuan.

There are no specimens of *W. sinensis* from northern China in this herbarium. The Shantung plant is probably cultivated, as it is said to occur "in den Dörfern."

Wistaria villosa sp. nov.

Wisteria chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 94 94 (Enum. Pl. Chin. Bor. 20) (1833).—Turczaninow in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowiez in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Non De Candolle.

Wistaria brachybotrys Hemsley in Jour. Linn. Soc. XXIII. 161 (1887), pro parte, quoad plantam e Peking.—Non Siebold & Zuccarini.

Wisteria venusta Rehder & Wilson in Sargent, Pl. Wilson. II. 514 (1916), quoad plantam chinensem.—Hers. Liste Ess. Lign. Honan Sept. 34 (1922).—Chung in Mem. Sci. Soc. China, I. 112 (Cat. Trees Shrubs China) (1924).

Frutex volubilis ramulis hornotinis dense subadpresse cinereo-villosis, annotinis glabrescentibus fusco-cinereis; gemmae floriferae 4–7 mm. longae, pubescentes. Folia sub anthesi plane expansa, indumento cinerascente non micante vestita, 4–5-, rarius 6-juga; petiolo 2–5 cm. longo incluso 15–32 cm. longa; foliola ovato-oblonga vel elliptico-oblonga vel oblongo-lanceolata, terminale saepe obovato-oblonga, 5–10 cm. longa et 2.3–3.5 cm. vel interdum ad 4 cm. lata, manifeste et saepe satis abrupte acuminata, basi late cuneata vel rotundata, supra laxe pilis albidis ad 1 mm. longis vel interdum ad 1.5 mm. longis conspersa, demum glabra, subtus densius pilis albidis longiusculis partim plus minusve curvatis persistentibus vestita, nervis utrinsecus 5–7 instructa; petioli 3–4 mm. longi, ut rhachis sed densius patenti-villosi. Racemi sessiles, penduli, multiflori, circiter 30 cm. longi, rhachi breviter denseque apicem versus laxius villosa; pedicelli fere sub angulo recto patentes, 1.5–3 cm. longi, villosi; calyx dense adpresse villosulus, violascens, cupularis, leviter bilabiatus vel fere truncatus dente antico lanceolato-subulato circiter 3–5 mm. longo excluso circiter 5 mm. altus, dentibus lateralibus quam medius dimidio brevioribus vel fere obsoletis, labio postico brevissimo subtruncato et plerumque brevissime bidentato; corolla ut videtur violacea, vexillo orbiculari, circiter 2 cm. diam. apice truncato et mucronulato basi profunde cordato extus glabro unguiculo 3 mm. longo, alis late oblongis 16 mm. longis et 8 mm. latis unguiculo 5 mm. longo, carina alis paullo breviore 9 mm. lata, apice emarginata; ovarium dense velutinum, stylus glaber. Legumen 18–24 cm. longum, circiter 2.5 cm. latum, 3–6-spermum.

CHILI: Temple of Sleeping Buddha, Wo-fu-ssu, western hills near Peking, *Ralph C. Mills*, July 25, 1923 (type), October 3, 1923; Ying tau ko, among high scrub, apparently genuinely wild, *F. N. Meyer*, no. 1299, September 12, 1913 (fruiting); Tientsin, Chinese Public Garden, *H. H. Chung*, no. 45, October 3, 1920 (fruiting).

? HONAN: without locality (ex Hers, l. c.).

SHANSI: Hia Hsien, Huang lai kow, *J. Hers*, no. 1872, October 2, 1921.

KIANGSU: wooded slope, Baillie's Farm, *J. N. Steward*, September 7, 1922 (Herb. Univ. Nanking, no. 2752).

This new species differs from all Asiatic Wistarias in its villose grayish white, not lustrous and silky pubescence persisting on the under side of the leaves. It seems nearest to *W. venusta* Rehd. & Wils. which differs chiefly in its appressed pubescence of short silky hairs yellowish and lustrous on the young leaves, those on the upper surface very short, closer and persistent until autumn, in its keel being truncate at the apex and in its flower-bearing winter-buds being about 1 cm. long with the inner scales very densely yellowish pubescent. It is also closely related to *W. sinensis* Sweet which differs chiefly in its silky straight less dense pubescence more or less yellowish and lustrous on young leaves and disappearing almost entirely at maturity; the leaves are usually only half grown at flowering time and the leaflets cuneate or broad-cuneate at the base; the tomentum of the fruit which is usually shorter and has fewer seeds is fulvous.

This is probably the plant mentioned by Dominicus Parennin, a Frenchman, who went to China in 1698 and died in Peking in 1741; he describes a climbing plant called teng lo with beautiful violet flowers hanging down in large bunches (see Bretschneider, Hist. Eur. Bot. Discov. China, 20).

There are no specimens from Honan in this herbarium and the reference cited above is probably a mistake and refers to the plant collected in Shansi.

The revision of the Wistarias from Eastern Asia in our herbarium brought to light another new species from China and a new variety from Japan which are described below.[1]

[1] **Wistaria brevidentata,** sp. nov.

Frutex volubilis, ramulis hornotinis accumbenti-villosis, annotinis glabrescentibus flavido-cinereis, vetustioribus cinereis; genmae floriferae circiter 6 mm. altae, perulis exterioribus striatis sericeis. Folia sub anthesi fere plane evoluta, petiolo 3–4 cm. longo incluso 13–17 cm. longa, 4–5-, rarius 6-juga; foliola elliptico- vel ovato-oblonga, 2.5–5 cm. longa et 1–1.8 cm. lata, acuminata, basi late cuneata vel rotundata, supra sparse strigoso-pilosa, subtus ad venas et densius ad costam, in facie sparse strigoso-pilosa; petioluli dense strigoso-villosi, 2–3 mm. longi; rhachis et petiolus sparse accumbenti-pilosus. Racemi 10–18 cm. longi, multiflori, floribus gradatim e basi ad apicem aperientibus; pedicelli 6–12 mm. longi ut rhachis dense breviter villosi; calyx cupularis, 3–4 mm. altus, velutinus, vix bilabiatus, dentibus 3 anticis triangularibus subaequilongis vel medio paullo longiore 1.5–2 mm. longo et quam tubus circiter 3-plo breviore; corolla violacea, vexillo suborbiculari 1.5 cm. diam. apice profunde emarginato, basi leviter cordato, extus ad basin villosulo, unguiculo 3 mm. longo, alis oblongis unguiculo 4 mm. longo incluso 16 mm. longis et 7 mm. latis, carina unguiculo 4 mm. longo incluso 16 mm. longa et 7 mm. lata apice profunde emarginata; stylus pilis paucis longis instructus. Legumen non vidi.

Yunnan: "jardins de Tong tschouan, cultivé et subspontané," alt. 2500 m., *E. E. Maire,* April (Arnold Arb. Distrib. no. 458, type).

Fukien: Fuchow, April 8 and 9, 1923 (Herb. Univ. Amoy, nos. 1265 and 1291).

This new species is characterized by its rather small flowers, short pedicels, the very short calyx-teeth, the emarginate standard pubescent outside at base. It seems nearest to *W. sinensis* Sweet which differs in its larger flowers more than 2 cm. long and its truncate standard not or scarcely hairy outside, in the elongated anterior calyx-tooth, in the 2–3 cm. long pedicels and in the flowers of each raceme opening nearly simultaneously. In its smaller flowers opening gradually from base to apex it resembles *W. floribunda* DC., but that species has more numerous leaflets, a longer raceme, longer pedicels, longer calyx-teeth, and a truncate standard glabrous on the back.

Wistaria venusta Rehder & Wilson f. **violacea,** f. nov.

Flores violacei, ceterum ut in typo.

Caragana chamlagu Lamarck, Encycl. Méth. I. 616 (1783).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 90 (Enum. Pl. Chin. Bor. 16) (1833).—Maximowicz in Bull. Soc. Nat. Moscou, LIV. 8 (1879).—Hemsley in Jour. Linn. Soc. XXIII. 163 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 49, 174, 331 (1898).—Harms in Bot. Jahrb. XXIX. 412 (1900); XXXVI. beibl. LXXXII. 58 (1905).—Komarov in Act. Hort. Petrop. XXIX. 200, t. 5, fig. B (Carag. Monog.) (1909).—Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).

Caragana chinensis Turczaninov apud Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).

CHILI: "China bor.," *A. Bunge* (Gray Herb.).—See also Bunge l. c., Maximowicz, l. c., Hemsley, l. c., Bretschneider, l. c. (p. 49), Komarov, l. c., and Chung, l. c.

SHANTUNG: *G. Staunton* (ex Hemsley, l. c., and Bretschneider, l. c. [p. 174]).—See also Chung, l. c.

SHENSI: Lean san and Tai pei shan, *G. Giraldi* (ex Harms, l. c., and Komarov, l. c.—See also Chung, l. c.

DISTRIBUTION: also Manchuria, Kiangsu, Kiangsi, Hupeh, Hunan, Kweichou and Yunnan.

Caragana rosea Turczaninov apud Bretschneider, Hist. Eur. Bot. Discov. China, 348 (1898).—Komarov in Act. Hort. Petrop. XXIX. 205, t. 5, fig. C (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

Caragana frutescens var. *floribus roseis* Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).

Caragana frutescens DC. *rosea* Turczaninov apud Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).

Caragana frutescens Hance in Jour. Bot. XIII. 131 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 235 (Pl. David. I. 83) (1883).—Palibin in Act. Hort. Petrop. XIV. 114 (1895).—Bretschneider, Hist. Eur. Bot. Discov. China, 53 (1898).—? Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 140 (1919).—Non De Candolle.

Caragana digitata Harms in Bot. Jahrb. XXIX. 412 (1900).—Non Lamarck.

Caragana frutex Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).—Non K. Koch.

Caragana chamlagu Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan Sept. 5 (1922).—Non Lamarck.

CHILI: Pagoda Hill, New Summer Palace, Peking, *C. S. Sargent*, September 17, 1903; hills near Great Wall, Kalgan road, *J. G. Jack*, October 5, 1905; Nankow Pass, *J. Hers*, no. 1599, August 15, 1921; Po hua shan, *J. Hers*, nos. 1386 and 1425, May 1, 1921; western hills near Peking, *J. Hers*, no. 1577, August 7, 1921; Miao feng shan, alt. 1000 m., *J. Hers*, no. 2532, June 17, 1923; Siao Wu tai shan, alt. 900 -

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JAPAN. Kyushu: Nishi Kirishima, alt. 0-500 m., *E. H. Wilson*, no. 10335, May 4, 1918 (type); cultivated round Mt. Kirishima, alt. 100-1000 m., *Z. Tashiro*, April 18 and 29, 1917.

This is apparently the wild form of the white-flowered *W. venusta* which is known only as a cultivated plant; it agrees with *W. venusta* in every character except the color of the flowers, as in its characteristic dense and persistent pubescence, in the large winter-buds, in the rather short sub-erect racemes and in the large flowers. This form therefore represents the phylogenetic type while the white-flowered form remains the nomenclatorial type.

1500 m., *J. Hers*, nos. 1469 and 2195, July 14, 1921 and October 9, 1922; near Kontze, in loess cliffs, *F. N. Meyer*, no. 1067, August 1, 1913; Weichang, *W. Purdom*, nos. 9 and 1136, in 1909; Wun po chun, *P. H. Dorsett*, no. 913, October 10, 1924.—See also Bretschneider, l. c., Komarov, l. c., Chung, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c., and Palibin, l. c.

HONAN: Hodien, *F. N. Meyer*, no. 1866, July 7, 1914; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 589, May 26, 1919; cultivated at Cheng chow, introduced from the hills, *J. Hers*, nos. 2586, 2856, August 2, 1923, and April, 1924.—See also Hers, l. c.

KANSU: near Lan chow fu, *P. J. Piasezki* (ex Komarov, l. c.).—See also Chung, l. c.

DISTRIBUTION: also Chekiang and Manchuria.

Caragana Leveillei Komarov in Act. Hort. Petrop. XXIX. 207, t. 5, fig. A (1909).—Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).

CHILI: Peking, "bought from a flower vender," *F. N. Meyer*, no. 926, May 12, 1913 (Herb. U. S. Dept. Agric.); Chao chow, *L. Chanel* (ex Komarov, l. c.).—See also Chung, l. c.

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 253, April 23, 1919.

SHENSI: Fukio, *G. Giraldi* (ex Komarov, l. c.).—See also Chung, l. c.

The type locality of this species cited by Komarov as Tchao-Tchao without mention of the province is apparently the French spelling for Chao chow, a place in southern Chili: the name of the collector given as L. Chanel should probably be Chanet, a French missionary who collected in Chili.

Caragana opulens Komarov in Act. Hort. Petrop. XXIX. 208 (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

SHANSI: Tsin-tse, *F. N. Meyer*, no. 409, May 5, 1907, Wu dai hsien, Ta nan Kow, *Tchuang Kich*, Hers no. 2052, September 7, 1922 (sterile, doubtful).

KANSU: Ma dja key, *F. N. Meyer*, no. 1795, October 10, 1914 (Herb. U. S. Dept. Agric. sterile, doubtful); several localities, *P. J. Piasezki* and *G. N. Potanin* (ex Komarov, l. c.).—See also Chung, l. c.

DISRTIBUTION: also southeastern Mongolia, eastern Tibet.

Caragana brevifolia Komarov in Act. Hort. Petrop. XXIX. 211, t. 17 (1909).—Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).

KANSU: near Labrang, alt. 3000–4000 m. *R. C. Ching*, no. 774, August 17–20, 1923.—See also Komarov, l. c., and Chung, l. c.

DISTRIBUTION: also Kashmir.

Ching's no. 774 differs from the original description in the slightly pubescent leaves and peduncles; the leaflets do not exceed 5 mm. in length.

Caragana pygmaea De Candolle, Prodr. II. 268 (1825). —Komarov in Act. Hort. Petrop. XXIX. 240 (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

SHANSI: *G. N. Potanin* (ex Komarov, l. c.). —See also Chung, l. c.

KANSU: Minchow, alt. 2400 m., *W. Purdom*, no. 1052, in 1910.—See also Komarov, l. c., and Chung, l. c.

DISTRIBUTION: also Siberia, Mongolia.

Purdom's no. 1052 represents var. *aicularis* Komar.

Caragana densa Komarov in Act. Hort. Petrop. XXIX. 258, t. 7 (1909). —Chung in Mem. Sci. Soc. China, I. 13 (Cat. Trees Shrubs China) (1924).

KANSU: on the Tao ho, *G. N. Potanin* (ex Komarov, l. c.).—See also Chung, l. c.

DISTRIBUTION: also Szechuan.

Caragana erinacea Komarov in Act. Hort. Prtrop. XXIX. 268, t. 9, fig. B (1909).—Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).

KANSU: Hoang ho valley near mouth of river Tschur myn, *N. Przewalkski* (ex Komarov, l. c.). —See also Chung, l. c.

DISTRIBUTION: also Szechuan.

Caragana Maximowicziana Komorov in Act. Hort. Petrop. XXIX. 269, t. 11, fig. B (1909). —Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).

KANSU: near Minchow, alt. 2400 2700 m. *W. Purdom*, no. 681, in 1910.—See also Komarov, l. c. and Chung l. c.

DISTRIBUTION: also eastern Tibet.

Caragana tragacanthoides Poiret, Encycl. Méth. Suppl. II. 90 (1811).—Komarov in Act. Hort. Petrop. XXIX. 270 (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

DISTRIBUTION: Turkestan and Songaria to Mongolia, Kansu, and northwest Himalaya.

In China occurs only the following variety:

Caragana tragacanthoides var. **villosa** Regel in Fedtschenko, Putetchest. Turkest. III. 19 (1882).—Komarov in Act. Hort. Petrop. XXIX. 272 (1909).

KANSU: *G. N. Potanin* and *P. J. Piasezki* (ex Komarov, l. c.).—See also Chung, l. c.

DISTRIBUTION of the variety: also Russian Turkestan and Karakorum.

Caragana tibetica Komarov in Act. Hort. Petrop. XXIX. 282, t. 10 (1909). Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

KANSU: "Kansu occidentalis" *G. N. Potanin*, May 11, 1885 (Gray Herb.); "Regio Tangut," *N. M. Przewalski*, in 1880 (Gray Herb.).—See also Komarov, l. c., and Chung, l. c.

DISTRIBUTION: also Szechuan.

Caragana tangutica Maximowicz apud Komarov in Act. Hort. Petrop. XXIX. 286, t. 12 (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

KANSU: Tetung valley, *N. Przewalski* (ex Komarov, l. c.).—See also Chung, l. c.

Caragana jubata Poiret, Encycl. Méth. Suppl. II. 89 (1911).—Regel in Gartenfl. X. 231, t. 331 (1861).—Komarov in Act. Hort. Petrop. XXIX. 287 (1909).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 416 (1922).—Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924).

CHILI: Hsiao Wu tai shan, alt. 3000 m., *F. N. Meyer*, no. 1222, August 13, 1913.—See also Komarov, l. c., Limpricht, l. c., and Chung, l. c.

SHANSI: Nan fang shan, alt. 800–900 m., very common on top of the range on the south in sunny places, *J. Hers*, no. 2735, September 22–30, 1923.—See also Komarov, l. c.

SHENSI: (ex Chung, l. c.).

KANSU: near Minchow, alt. 2700–3000 m., *W. Purdom*, no. 1053, in 1910.—See also Komarov, l. c., and Chung, l. c.

DISTRIBUTION: also eastern Siberia, Mongolia, Tibet, Turkestan and central Himalayas.

In Purdom's specimen from Kansu the flowers are decidedly pink.

Caragana arborescens Lamarck, Encycl. Méth. I. 615 (1783).—Komarov in Act. Hort. Petrop. XXIX. 321 (1909).—Chung in Mem. Sci. Soc. China, I. 113 (Cat. Trees Shrubs China) (1924), pro parte.

CHILI: Hsiao Wu tai shan, *J. Hers*, nos. 1500 and 1569, July 14, and 16, 1921.

DISTRIBUTION: also Siberia to the Altai Mountains, Transbaicalia and Mongolia.

Komarov does not enumerate specimens from northern China, but I have no doubt that Hers' specimens from Chili belong here. The Shantung reference by Chung (l. c.) is probably based on the enumeration by Harms & Loesener (in Bot. Jahrb. XXXVI. beibl. LXXXII. 58 [1905]) of *C. arborescens* as a shrub cultivated at Tsingtau.

Caragana Zahlbruckneri Schneider, Ill. Hand. Laubholzk. II. 96, fig. 59 g–h^3, 60 m. (1907).—Komarov in Act. Hort. Petrop. XXIX. 338 (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

Caragana microphylla Hemsley in Jour. Linn. Soc. XXIII. 163 (1887), pro parte, quoad plantam Hancockiie Shantung.—Non Lamarck.

CHILI: Nan kow Pass and Ku pei ku, *Wawra*, nos. 900 and 985, and

Lung tsyan sze, *Tatarinor* (ex Schneider, l. c., and Komarov, l. c.).—See also Chung, l. c.

SHANTUNG: Chi fu, *W. Hancock*, no. 26 (ex Komarov, l. c.).—See also Chung, l. c., and Hemsley, l. c.

DISTRIBUTION: endemic.

Caragana pekinensis Komarov in Act. Hort. Petrop. XXIX. 339, t. 15, fig. c (1909). Limpricht, Reise Hochgeb. Chin. Ost.-Tib. 416 (1922).– Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

Caragana microphylla γ Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 90 (Enum. Pl. Chin. Bor. 16) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).

Caragana microphylla Hemsley in Jour. Linn. Soc. XXIII. 163 (1887), pro parte, quoad exemplar Bretschneideri citatum.

CHILI: western hills, near Peking, *W. Purdom*, no. 1054, April 30, 1912; Tsing shui tsien, *J. Hers*, no. 1621, September 6, 1921; Hsiao Wu tai shan, southeastern valley, alt. 900–1500 m., *J. Hers*, no. 2191, October 9, 1922; Men tow kow, *J. Hers*, no. 2552, July 8, 1923.—See also Komarov, l. c., Limpricht, l. c., Chung, l. c., Bunge, l. c., Turczaninov, l. c., and Hemsley, l. c.

HONAN: Cheng chow, cultivated, introduced from the hills, *J. Hers*, no. 2855, April, 1924.

? SHENSI: "Seiu-ien-san prope Kan y huo," *G. Giraldi*, no. 4281 (ex Komarov, l. c.).

DISTRIBUTION: endemic.

Giraldi's specimen from Shensi quoted by Komarov is apparently the same plant as the type of *C. sericea;* both are cited as no. 4281, one from the herbarium at Berlin and the other from that of Florence and the variation in the citations is so slight that it is easily accounted for by omissions and mistakes in copying.

Caragana sericea Pampanini apud Komarov in Act. Hort. Petrop. XXIX. 342, t. 15, fig. A (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

SHENSI: "Seiu-ian san ad fl. Kayhuo," *G. Giraldi*, no. 4281 (ex Komarov, l. c.). See also Chung, l. c.

DISTRIBUTION: endemic.

Caragana Purdomii, sp. nov.

Frutex 1.5–2 m. altus, ramis griseo-lutescentibus junioribus initio laxe adpresse villosis mox glabrescentibus; stipulae induratae, spinosae, breves et suberectae, vel in ramulis robustis circiter 1 vel interdum 1.5 cm. longae, patentes vel rarius leviter recurvae. Folia 5–8-juga, petiolo 1–2.5 cm. longo incluso 3–6 cm. longa; rhachis tenuis, deciduа, leviter accumbenti-villosa vel basin versus glabrescens; foliola obovata vel elliptica vel anguste elliptica, 4–10 mm. longa, apice rotundata vel rarius acutiuscula, mucronata, basi cuneata, utrinque sparse sericeo-

villosa, pallide vel glaucescenti-viridia, nervis leviter elevatis. Pedunculi 1–3, 1.5–2.5 cm. longi, leviter villosuli vel glabrescentes, paulo infra apicem articulati, bractea subulata instructi; calyx campanulatus, 8–10 mm. longus et paullo angustior, puberulus vel fere glabrescens, dentibus late deltoideis dense villoso-ciliolatis acuminulatis 2 mm. longis; corolla lutea, 2.5 cm. longa, vexillo orbiculato-obovato 17–20 mm. lato, alis lamina oblonga auricula calcariformi acutiuscula et unguiculo 1 cm. longo instructis, carina obtusa oblonga longe unguiculata basi abrupte fere rectangulariter contracta; ovarium stipitatum stipite 2.5–3 mm. longo, apice attenuatum, basi et apice tantum uno latere sparse pilosum vel omnino glabrum; legumen valde immaturum compressum, anguste oblongum, basi et apice sensim attenuatum, stipite calycem fere aequante.

SHENSI: south of Yenan fu, *W. Purdom*, nos. 325, 326 (type) and 327, in 1910.

On account of its stipitate ovary this species seems to be closely related to *C. stipitata* Komar., but differs in its more numerous (10–16) obtuse leaflets, much larger flowers and glabrous or nearly glabrous ovary. Purdom's nos. 325 and 326 consist of rather slender branches with small subulate ascending spiny stipules, while no. 326 is represented by more vigorous branches with stout subulate spreading or occasionally somewhat reflexed and compressed spines up to 1.5 cm. long. The ovary in no. 325 is perfectly glabrous, in no. 326 sparingly pilose at base (above apex of stipe) and in no. 327 sparingly pilose at base and apex.

Caragana reticulata, sp. nov.

Frutex ramis robustis luteo-viridibus vel luteo-fuscis; stipulae spinosae, circiter 5 mm. longae. Folia 3–5 cm. longa petiolo 1–2 cm. longo incluso, 4-, vel rarius 3-juga; rhachis parce pubescens; foliola elliptica vel elliptico-oblonga, 1–2 cm. longa, acutiuscula vel obtusiuscula, minute mucronulata, basi late cuneata, supra obscura viridia, glabra, subtus pallidiora et sparsissime, ad costam et basin versus densius accumbenti-pilosa, firma, utrinque leviter reticulata, petiolulis villosis. Pedunculi 2–4, 1–15 cm. longi, villosuli, circa medium articulati; calyx late campanulatus, 5–6 mm. longus et paullo latior, adpresse villosus, margine fere truncato dense villoso-ciliolato dentibus ad mucronem reductis; legumen immaturum oblongum, stylo persistente excluso circiter 2.5 cm. longum et 6–7 mm. latum, valde compressum, apice et basi satis sensim attenuatum, tenuiter sericeo-pilosum et distincte elevato-reticulatum.

HONAN: Yungning, Tsi li ping, alt. 1100 m., *J. Hers*, no. 410, May 22, 1919.

Though the specimen bears only immature fruit, it seems so different from all other species known to me, that I venture to propose it as a new species. Its chief distinctive character lies in the comparatively short and broad, much flattened reticulate fruit which is only about

4 times as long as broad. In its leaves it resembles *C. arborescens* Lam., but differs in its pubescence, in the short pedunceles and in its fruit; it seems more closely related to *C. sericea* Pamp., and *C. pekinensis* Komar., but differs in its glabrescent leaves and in the fruit; the latter resembles in shape much that of *C. stipitata* Komar. according to Komarov's figure (Act. Hort. Petrop. XXIX. t. 15, fig. D) but it is sessile and its calyx is broader and nearly truncate.

Caragana stipitata Komarov in Act. Hort. Petrop. XXIX. 343, t. 15, fig. D (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

Caragana arborescens Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 58 (1905).—Non Lamarck.

SHENSI: many localities, *G. Giraldi* (ex Komarov, l. c.).—See also Chung, l. c.

DISTRIBUTION: endemic.

Caragana microphylla Lamarck, Encyel. Méth. I. 615 (1783).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 90 (Enum. Pl. Chin. Bor. 16) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859), excl. syn. Turczaninov; in Bull. Soc. Nat. Moscou, LIV. 8 (1879).—Regel in Gartenfl. X. 269, t. 336 (1861).—Hance in Jour. Bot. XIII. 131 (1875).—Hemsley in Jour. Linn. Soc. XXIII. 163 (1887), pro parte.—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 58 (1905).—Komarov in Act. Hort. Pegrop. XXIX. 344 (1909).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 140 (1919).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 162 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

Caragana altagana Poiret, Encyel. Méth. Suppl. II. 89 (1811).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).

CHILI: Peitaiho, Lotus hills, *N. H. Cowdry*, no. 168, May 28, and June 28, 1919.—See also Bunge, l. c., Maximowicz, l. c. (1859), Hance, l. c., Hemsley, l. c., Komarov, l. c., Cowdry, l. c., and Chung, l. c.

SHANTUNG: Tsing tau (ex Harms & Loesener, l. c.).—See also Maximowicz, l. c. (1879), Hemsley, l. c., and Chung, l. c.

HONAN: Hwei hsien, Shansi border, *J. Hers*, nos. 762 and 804 June 19, 1919.

SHENSI: Fan ngan fu and other localities, *G. Giraldi* (ex Harms l. c.).—See also Komarov, l. c. and Chung, l. c.

DISTRIBUTION: also Siberia, Mongolia and Manchuria.

Caragana Potanini Komarov in Act. Hort. Petrop. XXIX. 352, t. 16, fig. D (1909).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

CHILI: near Shih men on rocky places, *F. N. Meyer*, no. 1087, August 3, 1913.

SHANSI: Mao tou shan, near Yen men kuan and Utai shan, *G. N. Potanin* (ex Komarov, l. c.).—See also Chung, l. c.

DISTRIBUTION: endemic.

Desmodium podocarpum De Candolle in Ann. Sci. Nat. IV. 102 (1825); Prodr. II. 336 (1825).—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 70 (1905).—Harms & Loesener in Bot. Centralbl. Beih. XXHVII. pt. II. 141 (1919).—Chung in Mem. Sci. Soc. China, I. 115 (Cat. Trees Shrubs China) (1924).

SHANTUNG: Cape Jaeschke, *R. Zimmermann*, no. 503 (ex Harms & Loesener l. c.).—See also Chung, l. c.

SHENSI: Ki fou shan and Lean shan, *G. Giraldi* (ex Harms, l. c.).

DISTRIBUTION: also central and eastern China, Manchuria, Korea Japan and northern India.

Desmodium tiliifolium Don var. **Potaninii** Schindler apud Limpricht Bot. Reis. Hochgeb. Chin. Ost.-Tib. 428 (1922); in Fedde, Rep. Spec. Nov. XXII. 266 (1926).

KANSU: Hei ho, *G. N. Potanin* (ex Schindler, l. c.).

DISTRIBUTION; of the variety: also East Tibet.

Hedysarum multijugum Maximowicz in Mél. Biol. XI. 212 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 464 (1882).—Regel in Gartenfl. XXXII. 193, t. 1122 (1883).—Hemsley in Jour. Linn. Soc. XXIII. 169 (1887).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 805 (Pl. Enum. 17) (1891); in Szechenyi, Wissensch. Ergeb. Reise Ostas. II. 693 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 975 (1898).—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 71 (1905).—Farrer in Jour. Roy. Hort. Soc. XLII. 76 (1916).—Chung in Mem. Sci. Soc. China, I. 114 (Cat. Trees Shrubs China) (1924).

Hedysarum sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 75, no. 40746 (1918).

SHENSI: Ki san and Lean shan, *G. Giraldi* (ex Harms, l. c.).

KANSU: near Liang sin, *F. N. Meyer*, no. 1799, October 18, 1914 (Herb. U. S. Dept. Agric.).—See also Maximowicz, l. c., Hemsley, l. c., Kanitz, l. c., Farrer, l. c., Chung, l. c., and Meyer, l. c.

DISTRIBUTION: also Mongolia.

Astragalus chrysopterus Bunge in Bull. Acad. Sci. St. Pétersb. XXIV. 32 (1878); in Mél. Biol. X. 51 (1878) enumerated by Chung is, according to Bunge's description, an herbaceous perennial.

Lespedeza Buergeri Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 47 (1967); Prol. Fl. Jap. 235 (1867).—Harms in Bot. Jahrb. XXXVI. beibl. LXXXII. 70 (1905).—Schindler in Bot. Jahrb. XLIX. 580 (1913).—Bailey, Gent. Herb. I. 31 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan. Sept. 16 (1922).—Chung in Mém. Sci. Soc. China, I. 116 (Cat. Trees Shrubs China) (1924).

HONAN: Teng feng, Yu tai shan, *J. Hers*, no. 300, June 17, 1919; Lu shih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 881, October 10, 1919; Lung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1278, September 25, 1919; Sung hsien, San hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1310, Sept. 27, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1694, September 16, 1921; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2664, August, 1923 (in bud; doubtful); Cheng chow, cultivated (introduced from the western hills), *J. Hers*, no. 2580, August 2, 1923.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHENSI: Tai pei shan, *W. Purdom*, nos. 955, 956, in 1910.—See also Harms, l. c., Schindler, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Kiangsi; Japan.

Lespedeza formosa Koehne, Deutsch. Dendr. 343 (1893).—Schindler in Bot. Jahrb. XLIX. 580 (1913); in Sargent, Pl. Wilson. II. 107 (1914).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 141 (1919).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 429 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan Sept. 17 (1922).—Chung in Mem. Sci. Soc. China, I. 116 (Cat. Trees Shrubs China) (1924).

Lespedeza bicolor Harms in Bot. Jahrb. XXIX. 415 (1900), pro parte, quoad Giraldii nos. 1562, 1564, 1565; XXXIV. beibl. LXXV. 43 (1904), pro parte, quoad Zimmermannii no. 243.—Non Turczaninov.

Lespedeza bicolor var. Harms. in Bot. Jahrb. XXXIV. beibl. LXXV. 44 (1904).

SHANTUNG: Tsing tau, *R. Zimmermann*, nos. 243 and 276, in 1901.—See also Harms & Loesener, l. c., Harms, l. c. (1904), Schindler, l. c. (1914), and Chung, l. c.

HONAN: Hwei hsien near Shansi border, *J. Hers*, no. 706, June 19, 1919; Teng Feng, Yu tai shan, alt. 800 m., *J. Hers*, no. 292, June 17, 1919 (sterile); Lushih, Lao kium shan, alt. 2000 m., *J. Hers*, no. 1182, September 21, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1354, September 30, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2677, August 23, 1923.—See also Hers, l. c., and Chung, l. c.

SHENSI: several localities, *G. Giraldi*, nos. 1562, 1564, 1565 (ex Harms, l. c. [1900] and Schindler, l. c., [1913]).

DISTRIBUTION: also Kiangsu, Kiangsi, Fukien, Kwangtung, Hupeh, Szechuan; Japan, Korea, Assam.

Lespedeza Stottsae Bailey, Gent. Herb. I. 32 (1920).

HONAN: Chi kung shan (ex Bailey, l. c.).

DISTRIBUTION: endemic.

Lespedeza cyrtobotrya Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 48 (1867).—Schindler in Bot. Jahrb. XLIX. 582 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan Sept. 17 (1922).

Lespedeza bicolor Harms in Bot. Jahrb. XXIX. 415 (1900), pro parte, quoad Giraldii specim. nos. 1557 et 1559.—Non Turczaninov.

HONAN: Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1264, September 25, 1919.—See also Hers, l. c.

SHENSI: several localities, *G. Giraldi*, nos. 1557, 1559 (ex Harms, l. c., and Schindler, l. c.).

DISTRIBUTION: also Japan and Korea.

Lespedeza bicolor Turczaninov in Bull. Soc. Nat. Moscou, XIII. 69 (1840).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 140 (Fl. Tché-Foû, 45) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 247 (Pl. David. I. 95) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 211 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 179 (1887).—Faber in Denkschr. Entwick. Kiautschou, 32 (1898).—Harms in Bot. Jahrb. XXIX. 415 (1900); XXXIV. beibl. LXXV. 43 (1904), pro parte.—Schindler in Bot. Jahrb. XLIX. 583 (1913); in Bot. Centralbl. Beih. XXXVII. pt. II. 141 (1919).—Limpricht, Bot. Reid. Hochgeb. Chin. Ost.-Tib. 428 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan Sept. 116 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 162 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 116 (Cat. Trees Shrubs China (1924).

Lespedeza sp. *L. bicolori* affinis Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 470 (Ind. Fl. Pekin.) (1859).

Lespedeza bicolor β. *intermedia* Maximowicz in Act. Hort. Petrop. II. 356 (1873).

CHILI: Weichang, *W. Purdom*, no. 123, in 1909; Men tow kow, *N. H. Cowdry*, no. 487, June 8, 1920.—See also Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., Schindler, l. c. (1913), Cowdry, l. c., and Chung, l. c.

SHANTUNG: Chifu, *N. H. Cowdry*, no. 571, July 22, 1920.—See also Debeaux, l. c., Franchet, l. c., Harms, l. c. (1904), Schindler, l. c. and Chung, l. c.

HONAN: Hwei hsien, Ta fu sze, *J. Hers*, no. 770, June 16, 1919 (with young flower-buds; doubtful).—See also Hers, l. c., and Chiung, l. c.

SHANSI: Tung tsa, alt. 1500 m., *W. C. Lowderwielk*, Herb. Univ. Nanking, no. 5551.

SHENSI: Kin san, *G. Giraldi*, in 1897; Tai pei shan, *W. Purdom*, nos. 954 and 957, in 1910.—See also Harms, l. c., Schindler, l. c., (1913) and Chung, l. c.

DISTRIBUTION: also Mongolia, Manchuria, Korea and Japan.

Lespedeza floribunda Bunge in Mem. Kazan. Univ. IV. 164 ? (Pl. Mongh.-Chin. 13) (1835); Ann. Sci. Nat. Bot. sér. 2, VI. 59 (1836).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. II. 360 (1873).—Hance in Jour. Linn. Soc. XIII. 78 (1871).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 143 (Fl. Tché-Foû, 48) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 248 (Pl. David. I. 96) (1883); in Mém. Soc. Nat. Sci.

Nat. Cherbourg, XXIV. 211 (Cat. Pl. Tché-fou (1884).—Hemsley in Jour. Linn. Soc. XXIII. 181 (1887).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 806 (Pl. Enum. 18) (1891); in Szechenyi, Wissensch. Ergeb. Reise Ostas. II. 693 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 331 (1898).—Harms in Bot. Jahrb. XXIX. 415 (1900), excl. specimine Giraldii no. 1593; XXXIV. beibl. LXXV. 44 (1904).—Schindler in Bot. Jahrb. XLIX. 597 (1919); in Sargent, Pl. Wilson. II. 105 (1914); in Bot. Centralbl. Beih. XXXVII. pt. II. 142 (1919).—Limpricht, Bot. Reise Hochgeb. Chin. Ost.-Tib. 428 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan Sept. 17 (1922).—Chung in Mem. Sci. Soc. China, I. 116 (Cat. Trees Shrubs China) (1924).

Lespedeza medicaginoides Hemsley in Jour. Linn. Soc. XXIII. 182 (1887), pro parte, quoad specimina Bushellii et Tatarinovii.—Non Bunge.

Lespedeza trichocarpa Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan Sept. 17 (1922).—Non Persoon.

CHILI: hills near Nankow, *J. G. Jack*, October 5, 1905; Lan kia tun, *F. N. Meyer*, no. 1282, September 11, 1913; near Peking Jade Fountain, *N. H. Condry*, no. 1013, September 19, 1920; Nankow Pass, *J. Hers*, no. 1607, August 15, 1921; near Peking, western hills, *J. Hers*, no. 1616, September 4, 1921; Po hua shan, *J. Hers*, no. 1666, September 9, 1921.—See also Bunge, l. c., Maximowicz, l. c., Hance, l. c., Franchet, l. c., (1883), Hemsley, l. c., Schindler, l. c. (1913 and 1914), Limpricht, l. c., and Chung, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 253, in 1901 (Gray Herb.).—See also Debeaux, l. c., Franchet, l. c. (1884), Farms, l. c. (1904), Schindler, l. c. (1919), and Chung, l. c.

HONAN: Hwei hsien, Ta fu sze, *J. Hers*, no. 788, June 15, 1919; Yung ning, She pa pan, alt. 800 m., *J. Hers*, no. 847, October 7, 1919.—See also Hers, l. c., and Chung, l. c.

SHENSI: several localities, *G. Giraldi* (ex Harms, l. c.).

KANSU: Tsing chow, *J. Hers*, no. 2435, October 7, 1922.—See also Kanitz, l. c.

DISTRIBUTION: also Kiangsu, Hupeh, Manchuria.

Lespedeza sericea Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 49 (1867); Prol. Fl. Jap. 237 (1867).—Schindler in Bot. Jahrb. XLIX. 597 (1913), sub forma *α typica*; in Bot. Centralbl. Beih. XXXVII. pt. II. 142 (1919).—Chung in Mem. Sci. Soc. China, I. 117 (Cat. Trees Shrubs China) (1924).

Lespedeza juncea var. *sericea* Maximowicz in Act. Hort. Petrop. II. 371, in nota (1873).—Hemsley in Jour. Linn. Soc. XXIII. 181 (1887), sub var. γ.—Harms in Bot. Jahrb. XXIX. 415 (1900), excl. specim. Giraldii no. 1595.

Lespedeza juncea Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 143 (Fl. Tché-Foû, 49) (1876).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 211 (Cat. Fl. Tché-fou) (1884).—Faber in Denkschr. Entwick. Kiautschou, 32 (1898).—Harms in Bot. Jahrb. XXXIV. beibl. LXXV. 44 (1904).—Non Persoon.

Lespedeza juncea α. juncea Hemsley in Jour. Linn. Soc. XXIII. 181. (1887), pro parte, quoad specimina e Shantung et Kiangsi.—Non *L. juncea* Persoon.

SHANTUNG: Kiau chow region (ex Schindler, l. c. [1919]); near Chifu (ex Debeaux, l. c., Franchet, l. c., Faber, l. c., Harms, l. c. [1904], and Schindler, l. c. [1913]).—See also Hemsley, l. c., and Chung, l. c.

SHENSI: several localities, *G. Giraldi* (ex Harms, l. c., and Schindler, l. c. [1913]).

DISTRIBUTION: also eastern, central and western China to Korea, Japan, the Philippines, southern Asia, Kashmir and Afghanistan; Australia.

Lespedeza Caraganae Bunge in Mém. Kazan. Univ. IV. 162 ? (Pl. Mongh.-Chin. Dec. I. 11) (1835); Ann. Sci. Nat. Bot. sér. 2, VI. 59 (1836).—Turczaninov in Bull. Soc. Nat. Moscou , X. pt. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. II. 372 (1873).—Hemsley in Jour. Linn. Bot. XXIII. 179 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 331 (1898).—Schindler in Bot. Jahrb. XLIX. 602 (1913).—

CHILI: near Peking (ex Bunge, l. c., Maximowicz, l. c.).—See also Schindler, l. c., and Hemsley, l. c.

? SHANTUNG: near Chifu (ex Schindler, l. c.).

HONAN: Shao lin sse, distr. Teng fong, *A. A. Schindler*, no. 163, August, 1907.—See also Schindler, l. c.

SHENSI: several localities, *G. Giraldi* (ex Schindler, l. c.).

KANSU: Itel gol, *G. N. Potanin* (ex Schindler, l. c.).

DISTRIBUTION: endemic.

Lespedeza inschanica Schindler in Bot. Jahrb. XLIX. 603 (1913); in Bot. Centralbl. Beih. XXXVII. pt. II. 142 (1919).—Chung in Mem. Sci. Soc. China, I. 116 (Cat. Trees Shrubs China) (1924).

Lespedeza juncea var. *inschanica* Maximowicz in Act. Hort. Petrop. II. 371, in nota (1873).—Hemsley in Jour. Linn. Soc. XXIII. 181 (1887).

? *Lespedeza Caragana* Maximowicz in Act. Hort. Petrop. II. 372 (1873), quoad Kirilowii specimen cit.

Lespedeza medicaginoides Hemsley in Jour. Linn. Soc. XXIII. 182 (1887), quoad specimina Skatschkovii et Websteri.—Non Bunge.

Lespedeza juncea var. α. *juncea* Hemsley, l. c. 181 (1887), quoad Tatarinovii et Debeauxii specimina cit.

Lespedeza floribunda Harms in Bot. Jahrb. XXIX. 415 (1900), quoad Giraldii specimen, no. 1593.—Non Bunge.

Lespedeza juncea var. γ. *sericea* Harms, l. c., quoad Giraldii specimen no. 1595.—Non Maximowicz.

Lespedeza juncea Pers. var. Harms in Bot. Jahrb. XXXIV. beibl. LXXV. 44 (1904).

CHILI: *C. A. Skatschkoff*, about 1850 (Gray Herb.).—See also Schindler, l. c., Hemsley, l. c., and Chung, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 279, in 1901 (Gray Herb.).—See also Schindler, l. c., and Harms, l. c. (1904).

SHENSI: Ko lu pa and Peling, *G. Giraldi*, nos. 1593 and 1595 (ex Harms, l. c. [1900]).

DISTRIBUTION: also Manchuria, Korea and Japan.

Lespedeza juncea Persoon Syn. Pl. II. 318 (1907).—Bunge in Mém. Kazan. Univ. IV. 161 ? (Pl. Mongh. Chin. Dec. I. 10) (1835).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. II. 370 (1873). Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 248 (Pl. David. I. 96)(1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 175 (1898).—Schindler in Bot. Jahrb. XLIX. 604 (1913); in Bot. Centralbl. Beib. XXXVII. pt. II. 142 (1919).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 117 (Cat. Trees Shrubs China) (1924).

Lespedeza juncea var. α. *juncea* Hemsley in Jour. Linn. Soc. XXIII. 181 (1887), pro parte, quoad Stauntonii et Davidii specimina cit.

CHILI: hills near Peking, *S. W. Williams*, August, 1876 (Gray Herb.); near Tan wka, on rocky mountains slopes, alt. 1600 m., *E. N. Meyer*, no. 1109, August 4, 1913 (Herb. U. S. Dept. Agric.); Pei tai ho, Lotus hills, *N. H. Cowdry*, no. 508, September 4, 1919.—See also Bunge, l. c., Maximowicz, l. c., Franchet, l. c., Bretschneider, l. c., Schindler, l. c. (1913), Cowdry, l. c., and Chung, l. c.

SHANTUNG: Tsing tau, *Krug*, no. 357, and Chifu, *Waura*, no. 1248 (ex Schindler, l. c.).—See also Chung, l. c.

DISTRIBUTION: also eastern Siberia.

Lespedeza daurica Schindler in Fedde, Rep. Spec. Nov. XXII. 274 (1926).

Trifolium dauricum Laxmann in Nov. Comm. Acad. Petrop. XV. 560, t. 30, fig. 5 (1771).

Lespedeza trichocarpa Persoon, Syn. Pl. II. 318 (1807).—Bunge in Mém. Kazan Univ. IV. 161? (Pl. Mongh.-Chin. Dec. I. 10) (1835).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (1859); in Act. Hort. Petrop. II. 375 (1873).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 142 (Fl. Tché-Foû, 47) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 249 (Pl. David. I. 97) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 211 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 183 (1887).—Palibin in Act. Hort. Petrop. XIV. 115 (1895). Faber in Denkschr. Entwick. Kiautschou, 32 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 53 (1898).—Harms in Bot. Jahrb. XXIX. 415 (1900); XXXIV. beibl. LXXV. 44 (1904).—Schindler in Bot. Jahrb. XLIX. 606 (1913); in Bot. Centralbl. Beih. XXXVII. pt. II. 142 (1919).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 429 (1922).—Cowdry in Jour. N. China Branch. R. As. Soc. LIII. 163 (Pl. Pei tai ho) (1922).

Lespedeza medicaginoides Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 93 (Enum. Pl. Chin. Bor. 19) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 248 (Pl. David. I. 96) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 182 (1887), pro parte, quoad Stauntonii et Williamsii specimina citata.—Bretschneider, Hist. Eur. Bot. Discov. China, 175, 332 (1898).

Lespedeza juncea var. α. *juncea* Hemsley in Jour. Linn. Soc. XXIII. 181 (1887), quoad Bushellii specimen cit.—Non Maximowicz.

CHILI: hills near Peking, *S. W. Williams*, August 1876 (Gray Herb.); Pei tai ho, on sand hummocks, *N. H. Cowdry*, no. 383, August 1, 1919; roadside south of Peking, *N. H. Cowdry*, no. 507, June 6, 1920. See

also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c. (1883), Hemsley, l. c., Bretschneider, l. c., Limpricht, l. c., and Cowdry, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 246, in 1901 (Gray Herb.); near Chifu, *N. H. Cowdry*, nos. 602, 603, 604, July and August 1, 1920.—See also Debeaux, l. c., Franchet, l. c. (1884), Faber, l. c., Harms, l. c. (1904), and Schindler, l. c.

SHENSI: several localities, *G. Giraldi* (ex Harms, l. c.).

DISTRIBUTION: also Hupeh to Yunnan, eastern Siberia to Korea.

Lespedeza virgata De Candolle, Prodr. II. 350 (1825).—Franchet, in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 212 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 183 (1887).—Faber in Denkschr. Entwick. Kiautschou, 32 (1898).—Harms in Bot. Jahrb. XXXIV. beibl. LXXV. 44 (1904); XXXVI beibl. LXXXII. 70 (1905).—Schindler in Bot. Jahrb. XLIX. (1913); in Bot. Centralbl. Beih. XXXVII. pt. II. 142 (1919).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (Pl. Peitaiho) (1922).

CHILI: Lotus hills, near Pei tai ho, *N. H. Cowdry*, no. 166, August 25, 1919.—See also Cowdry, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 253, in 1901 (Gray Herb.).—See also Franchet, l. c., Hemsley, l. c., Faber, l. c., Harms, l. c. (1904), and Schindler, l. c. (1919).

SHENSI: without locality (ex Harms, l. c. [1905]).

DISTRIBUTION: also eastern and central China, Korea and Japan.

Lespedeza tomentosa Siebold apud Maximowicz in Act. Hort. Petrop. II. 376 (1873).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 141 (Fl. Tché-Foû, 46) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 247 (Pl. David. I. 97) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 212 (Cat. Pl. Tché-fou) (1884).—Harms in Bot. Jahrb. XXXIV, beibl. LXXV. 44 (1904); XXXVI. beibl. LXXXII. 70 (1905).—Schindler in Bot. Jahrb. XLIX. 622 (1913); in Bot. Centralbl. Beih. XXXVII. pt. II. 143 (1919).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (Pl. Peitaiho) (1922).

Lespedeza villosa Persoon, Syn. Pl. II. 318 (1807).—Hemsley in Jour. Linn. Soc. XXIII. 183 (1887).—Faber in Denkschr. Entwick. Kiautschau, 32 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 331 (1898).

Lespedeza macrophylla Bunge in Mém. Kazan. Univ. IV. 161 ? (Pl. Mongh.-Chin. Dec. I. 10) (1836)..—Turczaninov in Bull. Soc. Moscou, X. pt. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).

CHILI: Peking, *S. W. Williams*, August 1867, Herb. Hance no. 6520 (Gray Herb.); near Pei tai ho, *N. H. Cowdry*, no. 509, July, 1919.—See also Maximowicz, l. c., Franchet, l. c. (1883), Cowdry, l. c., Hemsley, l. c., Bunge, l. c., and Turczaninov, l. c.

SHANTUNG: without precise locality, *Li Tai-fang*, August 9, 1915, Herb. Univ. Nanking, no. 970.—See also Maximowicz, l. c., Debeaux,

l. c., Franchet, l. c. (1884), Harms, l. c. (1904), Schindler, l. c. (1919), and Hemsley, l. c.

SHENSI: without precise locality (ex Harms, l. c. [1905]).

DISTRIBUTION: also eastern to western China; eastern Siberia to Korea and Japan; Kashmir.

Only the species of the section Macrolespedeza to which the first four species belong and *L. floribunda* of section Eulespedeza can be considered true shrubs, while all the other species of Eulespedeza enumerated are but suffruticose.

Campylotropis macrocarpa Rehder in Sargent, Pl. Wilson. II. 113, in nota (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan Sept. 5 (1922). -Chung in Mem. Sci. Soc. China, I. 117 (Cat. Trees Shrubs China) (1924).

Lespedeza macrocarpa Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 92 (Enum. Pl. Chin. Bor. 18) (1833).—Maximowiez in Act. Hort. Petrop. II. 351 (1873).—Hemsley in Jour. Linn. Soc. XXIII. 182 (1887). Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).

Campylotropis chinensis Bunge in Mém. Kazan. Univ. IV. 158 ? (Pl. Mongh.-Chin. Dec. I. 7) (1835); in Ann. Sci. Nat. Bot. sér. 2, VI. 58 (1836).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Schindler in Bot. Jahrb. XLIX. 340 (1923); in Sargent, Pl. Wilson. II. 113 (1914).

CHILI: Pagoda Hill, near Summer Palace, Peking, *C. S. Sargent*, September 17, 1903; near Nankow and hills near Great Wall, *J. G. Jack*, October 5, 1905; Ying tan ko, *F. N. Meyer*, no. 1182, September 12, 1913; near Wo fu su, hunting park, *N. H. Cowdry*, no. 1012, September 27, 1920; Nankow pass, *J. Hers*, no. 1602, August 15, 1921; Peking, western hills, *J. Hers*, no. 1615, September 4, 1921; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, no. 2177, October 8, 1922; without precise locality, *Père Chanet*, no. 70, in 1919.—See also Bunge, l. c., Maximowiez, l. c., Hemsley, l. c., Turczaninov, l. c., Schindler, l. c. (1914), and Chung, l. c.

HONAN: Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1290, September 25, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1767, September 21, 1921; without precise locality, *J. Hers*, no. 1993, in 1922. —See also Hers, l. c., and Chung, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1869, October 2, 1921.

SHENSI: Hua shan, alt. 1000 m., *J. Hers*, no. 3106, October 31, 1924.

DISTRIBUTION: also eastern to western China.

Campylotropis Giraldii Schindler in Fedde, Rep. Spec. Nov. IX. 518 (1911); XI. 340 (1912).— Chung in Mem. Sci. Soc. China, I. 117 (Cat. Trees Shrubs China) (1924).

Lespedeza macrocarpa Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 246 (Pl. David. I. 94) (1883).—Diels in Bot. Jahrb. XXIX. 414 (1900), quoad Giraldii specimina cit.—Non Bunge.

CHILI: mountains near Peking (ex Franchet, l. c., and Schindler, l. c. [1912]).

HONAN: Yung ning, Tsi li ping, *J. Hers*, no. 462, May 22, 1919; Yung ning, Yo tze pin, alt. 1000 m., *J. Hers*, no. 836, October 5, 1919; Lu shih, Lao kiun shan alt. 2000 m., *J. Hers*, no. 1199, September 21, 1919; without precise locality, *J. Hers*, no. 41, in 1918.—See also Schindler, l. c. (1911).

SHANSI: Nan fang shan, alt. 1500–2500 m., *J. Hers*, no. 2732, September 22–30, 1923.

SHENSI: several localities, *G. Giraldi* (ex Schindler, l. c. [1911]).

DISTRIBUTION: also Formosa (*Wilson*, no. 11097, det. A. K. Schindler).

Except in its pubescent fruit this species differs little if at all from *C. macrocarpa* Rehd. and may be considered only a form of that species; also the fact that it occurs within the northern part of the range of *C. macrocarpa* seems to point that way. The Formosan specimen differs in its smaller nearly glabrous leaves bright green on both sides and distinctly reticulate and it probably represents a different form. The leaves of *C. Giraldii* vary from glabrescent as in Hers' no. 2732 to densely villous-pubescent and the inflorescence may have a glabrescent peduncle and rather slightly appressed-pubescent pedicels or it may be densely covered with villose spreading hairs throughout sometimes interspersed with glandular hairs as in Hers' no. 41.

Dalbergia hupeana Hance in Jour. Bot. XX. 5 (1882).—Bailey, Gent. Herb. I. 31 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan Sept. 10 (1922).—Chung in Mem. Sci. Soc. China, I. 118 (Cat. Trees Shrubs China) (1924).

HONAN: Chikung shan, *L. H. Bailey*, June 13, 1917; Teng feng, Yu tai shan, alt. 800 m., *J. Hers*, no. 287, June 17, 1919; Yung ning, Tsi li ping, alt. 1100 m., *J. Hers*, nos. 414, and 1359, May 22 and September 30, 1919; Yung ning, Tieh lu ping, alt. 800 m., *J. Hers*, no. 1103, October 16, 1919; Siao Hsien, Huang tsang yu, alt. 200 m., *J. Hers*, no. 1013, April 25, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2649, August 22, 1923; Ki kung shan, *A. N. Steward*, July, 1925, Herb. Univ. Nanking, no. 9689; without precise locality, *J. Hers*, no. 1991, in 1922.—See also Hers, l. c., and Chung, l. c.

NORTHERN KIANGSU: Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2261, October 8, 1922; Su chow fu, Huang tsang yu, alt. 200 m., *J. Hers*, nos. 1065, 2813, November 1, 1919 and October 15, 1923.

DISTRIBUTION: also eastern to central China.

Dalbergia Dyeriana Prain in Jour. As. Soc. Beng. LXX 4[1] (Novic. Ind. 370) (1901).—Harms in Bot. Jahrb. XXXVI. beib[l]. LXXXII. 70 (1905).

SHENSI: Lean shan, *G. Giraldi*, no. 4032 (ex Harms, l. c.).

DISTRIBUTION: also Hupeh, Szechuan and Yunnan.

Vicia unijuga A. Braun in Ind. Sem. Hort. Berol. 1853, p. 12.—Maximowicz in Bull. Acad. Sci. St. Pétersb. XVIII. 394 (1873); in Mél. Biol.

IX. 65 (1873).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 146 (Fl. Tché-Foû, 51) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 251 (Pl. David. I. 99) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 212 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 186 (1887).—Palibin in Act. Hort. Petrop. XIV. 115 (1895).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Harms in Bot. Jahrb. XXIX. 416 (1900); XXXIV. beibl. LXXV. 45 (1904).—Farrer in Jour. Roy. Hort. Soc. XLII. 114 (1916).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 143 (1919).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 429 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 119 (Cat. Trees Shrubs China) (1924).

Orobus lathyroides Linnaeus, Spec. II. 728 (1753).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).

CHILI: Pei tai ho, *N. H. Cowdry*, no. 70, July, 1919.—See also Maximowicz, l. c., Franchet., l. c. (1883), Hemsley, l. c., Palibin, l. c., Limpricht, l. c., Cowdry, l. c., and Chung, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 218, in 1901 (Gray Herb.).—See also Debeaux, l. c., Franchet, l. c. (1884), Hemsley, l. c., Faber, l. c., Harms, l. c. (1904), Harms & Loesener, l. c., and Chung, l. c.

SHENSI: Ki shan and Tai pei shan, *G. Giraldi* (ex Harms, l. c. [1900]).—See also Chung, l. c.

KANSU: Satanee range (ex Farrer, l. c.).

DISTRIBUTION: also Kiangsi and through Hupeh and Szechuan to Yunnan; eastern Siberia to Korea and Japan.

Pueraria Thunbergiana Bentham in Jour. Linn. Soc. IX. 122 (1867).—Maximowicz in Bull. Soc. Nat. Moscou, LIV. 9 (Fl. As. Or. Fragm.) (1879).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 213 (Fl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 191 (1887).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 1051 (1898).—Harms in Bot. Jahrb. XXIX. 417 (1900); XXXIV. beibl. LXXV. 45 (1904).—Harms & Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 144 (1919).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (Pl. Peitaiho) (1922).

Pueraria hirsuta Schneider, Ill. Handb. Laubholzk. II. 114, fig. 72 (1907).—Bailey, Gent. Herb. I. 32 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan Sept. 23 (1922).—Chung in Mem. Sci. Soc. China, I. 121 (Cat. Trees Shrubs China) (1924).—Non Kurz.

CHILI: near Peking (ex Maximowicz, l. c., and Hemsley, l. c.).—See also Cowdry, l. c., and Chung, l. c.

SHANTUNG: Tsingtau, *R. Zimmermann*, no. 244, in 1901.—See also Franchet, l. c., Hemsley, l. c., Faber, l. c., Harms, l. c. (1904), Harms & Loesener, l. c., and Chung, l. c.

HONAN: Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 115 D, September 21, 1919; Lushih, Tung ho, alt. 1000 m., *J. Hers*, no. 988,

October 14, 1919; Lushih, Ta she ho, *J. Hers*, no. 999, October 14, 1919; Yung ning, Tsi li ping, *J. Hers*, no. 474 May 22, 1919.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHENSI: Tai pei shan, *W. Purdom*, no. 958, in 1910.—See also Harms, l. c. (1900), and Chung, l. c.

DISTRIBUTION: throughout China; Korea and Japan, Formosa and Philippine Islands.

ZYGOPHYLLACEAE

Zygophyllum xanthoxylum Maximowicz, Fl. Tangut. 103 (1889).—Engler in Engler & Prantl, Nat. Pflanzenfam. abt. 3, IV. 81 (1890).

Sarcozygium xanthoxylum Bunge in Linnaea, XVII. 8, t. 1 (1843).—Walpers Rep. V. 385 (1845).—Hance in Jour. Bot. XX. 258 (1882).—Hemsley in Jour. Linn. Soc. XXIII. 97 (1887).

KANSU: (ex Maximowicz, l. c., and Hemsley, l. c.).

DISTRIBUTION: also Mongolia and Sinkiang.

Nitraria Schoberi Linnaeus, Spec. ed. 2, 638 (1762).—Hemsley in Jour. Linn. Soc. XXIII. 97 (1887).—Maximowicz, Fl. Tangut. 102 (1889).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 801 (Pl. Enum. 12) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 688 (1898).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl, Imp. XXXVII. 67, no. 36800 (1916).—Farrer in Jour. Roy. Hort. Soc. XLII. 86 (1916).—Chung in Mem. Sci. Soc. China, I. 122 (Cat. Trees Shrubs China) (1924).

CHILI: Tientsin, *F. N. Meyer*, no. 1226, June 18, 1913; near Taku, *N. H. Cowdry*, no. 597, June 20, 1920.—See also Chung, l. c.

SHENSI (or Kansu?): "Tsung lin range, Piasezki ex Maximowicz" (ex Hemsley, l. c.).—See also Chung, l. c.

KANSU: between Titao and Lanchow, *J. Rock*, no. 13240, August, 1925.—See also Kanitz, l. c., and Farrer, l. c.

DISTRIBUTION: also Syria to Turkestan and Mongolia.

RUTACEAE

Zanthoxylum simulans Hance in Ann. Bot. sér. 5, V. 208 (1866), sub *Xanthoxylum*.

Zanthoxylum nitidum Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 87 (Enum. Pl. Chin. Bor. 13) (1833).— Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Non De Candolle.

Zanthoxylum Bungei Planchon in Ann. Sci. Nat. sér. 3, XIX. 82 (1853), nom. nudum.—Hance in Jour. Bot. XIII. 131 (1875), sub *Xanthoxylum;* non 1866.—Franchet in Nouv. Arch. Mus. Paris, sér. *2*, V. 218 (Pl. David. I. 66) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 105 (1886).—Maximowicz, Fl. Tangut. 107 (1889); in Act. Hort. Petrop. XI. 93 (1889).—Pritzel in Bot. Jahrb. XXIX. 421 (1900), sub *Xanthoxylum*.—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 146 (1919), sub *Xanthoxylum*.—Rehder & Wilson in Sargent, Pl. Wilson. II. 121 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 117 (1922); Liste Ess. Lign. Honan Sept. 34 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 161 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 122 (Cat. Trees Shrubs China) (1924).

Zanthoxylum Bungeanum Maximowicz in Bull. Acad. Sci. St. Pétersb. XVI. 212 (1871); in Mél. Biol. VIII. 2 (1871).
Zanthoxylum Bungei var. *imperforatum* Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 205 (Cat. Pl. Tché-fou) (1884).

CHILI: Peking, *C. A. Skatschkoff*, about 1850; near Peking, in a hedge, *C. S. Sargent*, September 16, 1903; Tientsin, cultivated, *F. N. Meyer*, no. 1003, June 16, 1913; Ta han ling, *J. Hers*, no. 1641, September 7, 1921.—See also Maximowiez, l. c., Bunge, l. c., Hance, l. c., Franchet, l. c. (1883), Hemsley, l. c., Rehder & Wilson, l. c., Cowdry, l. c., and Chung, l. c.

SHANTUNG: near Chifu, side of cultivated orchard, *N. H. Cowdry*, no. 592, July 10, 1920.—See also Hemsley, l. c., Maximowiez, l. c. (1890), Loesener, l. c., Chung, l. c., and Franchet, l. c. (1884).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 604, May 5, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2290, October 8, 1922.

HONAN: Lushih, Tang ho, alt. 1000 m., *J. Hers*, no 959, October 11, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1790, September 21, 1921; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2655, August 22, 1923.—See also Hers, l. c.

SHENSI: "Lao-y-san," *G. Giraldi*, September 6, 1897; Tai pei shan, *W. Purdom*, no. 1042, in 1910.—See also Pritzel, l. c., Rehder & Wilson, l. c., and Chung, l. c.

KANSU: Tsing chow, Kuan tji cher, alt. 100 m., *J. Hers*, no. 2416, July, 1922.

DISTRIBUTION: also Chekiang, Kiangsi, Hupeh, Szechuan, Fukien; Manchuria, Korea.

This species has been generally known as *Z. Bungei* Planchon, but this is unfortunately a nomen nudum, being neither accompanied by a description nor referable to a previous description, for the synonym on which it is based, *Z. nitidum* Bunge, not De Candolle, is itself a nomen nudum. The matter is made still more complicated by the fact that Hance in 1866 (in Ann. Sci. Nat. sér. 5, v. 209) published as *Xanthoxylum Bungei* a species with a complete description, based on a plant from Fukien distributed by him a few years earlier as *X. planispinum*. This plant was considered by Bentham to be identical with *Z. nitidum* Bge. and this apparently induced Hance to call his plant *X. Bungei*, not having at the time of writing (in December, 1864) any knowledge of Planchon's earlier use of the same name. The description, however, fits *Zanthexylum alatum* Roxb. much better than Bunge's plant, and Hemsley who has seen the specimen, refers Hance's name to *Z. alatum*, though he enumerates Hance's no. 1480 (?misprint for no 1460 cited by Hance for his *X. Bungei*) in part at least under *Z. Bungei* Planchon.

The next oldest name for this species appears to be *Z. simulans* Hance, though this represents apparently a small-leaved form, somewhat differing from the better known northern plant in its much smaller

leaflets (3–11 lines long and 2–6 lines broad according to Hance), more prickly beneath and occasionally so above; specimens from near Amoy, Fukien, approaching this form are represented in our herbarium by Herb. Univ. Amoy nos. 1596, 1761 and the less extreme no. 1490.

Zanthoxylum simulans var. **Zimmermannii**, comb. nov.

Zanthoxylum Bungei Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904), quoad specim. Zimmermannii no. 460.

Zanthoxylum Bungei var. *Zimmermannii* Rehder & Wilson in Sargent, Pl. Wilson. II. 122 (1914).

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 460, in 1901.—See also Loesener, l. c., and Rehder & Wilson, l. c.

DISTRIBUTION: also Korea.

Zanthoxylum Piasezkii Maximowicz in Act. Hort. Petrop. XI. 93 (1889).

Zanthoxylum piperitum Maximowicz apud Hemsley in Jour. Linn. Soc. XXIII. 106 (1886); quoad specim. Piasezkii.— ?Pritzel in Bot. Jahrb. XXIX. 421 (1900).—Non De Candolle.

SHENSI: near Kwan yin tang, *F. N. Meyer*, nos. 1735, 1736, September 15, 1914 (Herb. U. S. Dept. Agric.).—See also Pritzel, l. c.

KANSU: near Yan pu ko, *F. N. Meyer*, no. 1976, October 7, 1914. (Herb. U. S. Dept. Agric.).—See also Maximowicz, l. c.

DISTRIBUTION: also Szechuan and Yunnan.

There is also in this herbarium a specimen of a plant raised in Hort. H. A. Hesse, Weener, Germany, from seed sent by Giraldi, which represents *Z. Piasezkii*.

Zanthoxylum setosum Hemsley in Jour. Linn. Soc. XXIII. 107 (1886).—Bailey, Gent. Herb. I. 33 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 117 (1922); Liste Ess. Lign. Honan Sept. 34 (1922).—Chung in Mem. Sci. Soc. China, I. 123 (Cat. Trees Shrubs China) (1924).

HONAN: Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1297, September 27, 1919 (a small tree 3 m. tall); Kioshan, *L. H. Bailey*, June 20, 1917.—See also Bailey, l. c., and Hers, l. c.

DISTRIBUTION: also Kiangsi, Chekiang, Hupeh and Szechuan.

The specimens cited above are much less hairy than the type.

Zanthoxylum undulatifolium Hemsley in Ann. Bot. IX. 148 (1895).—Pritzel in Bot. Jahrb. XXIX. 421 (1920).—Rehder & Wilson in Sargent, Pl. Wilson. II. 124 (1914).—Chung in Mem. Sci. Soc. China I. 124 (Cat. Trees Shrubs China) (1924).

SHENSI: Kin san, *G. Giraldi*, in 1897; Tai pei shan, *W. Purdom*, no. 1147, in 1910.—See also Pritzel, l. c., Rehder & Wilson, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh and Szechuan.

Zanthoxylum alatum Roxb. var. **planispinum** Rehder & Wilson in Sargent, Pl. Wilson. II. 125 (1916).—Bailey, Gent. Herb. I. 33 (1920).—Chung in Mem. Sci. Soc. China, I. 122 (Cat. Trees Shrubs China) (1924).

Zanthoxylum planispinum Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 138 (Fl. Jap. Fam. Nat. I. 30) (1846).—Maximowicz in Act. Hort. Petrop. XI. 95 (1890).—Pritzel in Bot. Jahrb. XXIX. 421 (1900), sub *Xanthoxylum*.

Zanthoxylum alatum Hemsley in Jour. Linn. Soc. XXIII. 105 (1886), pro parte.—Pritzel in Bot. Jahrb. XXIX. 421 (1900).—Hers in Jour. N. China Branch R. As. Soc. LIII. 117 (1922); Liste Ess. Lign. Honan Sept. 34 (1922).

HONAN: Chikung shan, *L. H. Bailey*, June 29, 1917; Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 279, June 17, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 594, May 26, 1919; Yung ning, Tieh lu ping, alt. 800 m., *J. Hers*, no. 1001, October 16, 1919.—See also Hers, l. c., and Chung, l. c.

SHENSI: Nan to tchu, *F. N. Meyer*, no. 1844, January 20, 1914; near Sze nu hsien, *F. N. Meyer*, no. 1893, September 1, 1914 (Herb. U. S. Dept. Agric.).—See also Maximowicz, l. c., Pritzel, l. c., and Chung, l. c.

KANSU: Tsung-lin, *P. J. Piasezki* (ex Maximowicz, l. c.).

DISTRIBUTION: also throughout China southward; Korea and Japan.

Zanthoxylum piperitum De Candolle, Prodr. I. 725 (1825).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 205 (Cat. Pl. Tché-fou).—Hemsley in Jour. Linn. Soc. XXIII. 107 (1886), excl. specimine Piasekii cit.—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 146 (1919).—Chung in Mem. Sci. Soc. China, I. 123 (Cat. Trees Shrubs China) (1924).

? SHANTUNG: Chifu (ex Franchet, l. c.) and Kiauchou (ex Faber, l. c.).—See also Hemsley, l. c., Loesener, l. c., and Chung, l. c.

DISTRIBUTION: also Korea, Japan.

It is very doubtful if *Z. piperitum* occurs in China. I have seen no Chinese specimen and Hemsley cites it only on the authority of Franchet and Loesener on that of Faber. These authors probably confused it with the following species which is similar in general appearance, though very distinct in the structure of its flowers and the arrangement of the prickles.

Zanthoxylum schinifolium Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 137 (Fl. Jap. Fam. Nat. I. 29) (1846).—Hance in Jour. Bot. XXI. 296 (1883).—Franchet, in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 205 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 107 (1886).—Bailey, Gent. Herb. I. 33 (1920).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 161 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 123 (Cat. Trees Shrubs China) (1924).

Fagara schinifolia Engler in Engler & Prantl, Nat. Pflanzenfam. III. abt. IV. 118 (1896).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 147 (1919).

Xanthoxylum sp. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XII. 27, 62, nos. 17181, 17951 (1907).

CHILI: Shan hai kwan, *F. N. Meyer*, no. 203, October, 1905; Lotus hills, Pei tai ho, *N. H. Cowdry*, no. 172, August, 1919. See also Cowdry, l. c.

SHANTUNG: Lau shan, *F. N. Meyer*, nos. 276, 295, August, 1907; Chifu (ex Hance, l. c., Franchet, l. c., and Hemsley, l. c.) and Kiau chou district (ex Loesener, l. c.).—See also Chung, l. c.

HONAN: Chi kung shan (ex Bailey, l. c.).—See also Chung, l. c.

DISTRIBUTION: also Chekiang, Kiangsi, Hupeh, Szechuan; Korea, Japan.

Zanthoxylum schinifolium f. **macrocarpum**, comb. nov.

Fagara schinifolia Engl. f. *macrocarpa* Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 147 (1919).

SHANTUNG: Tsingtau (ex Loesener, l. c.).

Evodia Daniellii Hemsley in Jour. Linn. Soc. XXIII. 104 (1886).—Rehder & Wilson in Sargent, Pl. Wilson. II. 135 (1914).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 147 (1919).—Chung in Mem. Sci. Soc. China, I. 124 (Cat. Trees Shrubs China) (1924).

Zanthoxylum Daniellii Bennett in Ann. Nat. Hist. sér. 3, x. 201, fig. 5 (1862).

Zanthoxylum Bretschneideri Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 73 (1884); in Mél. Biol. XI. 655 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 105 (1886).

Fagara ailanthoides Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XIV. 46, no. 22342 (1909).—Non Engler.

CHILI: mountains near Peking, *E. Bretschneider*, no. 152 (Gray Herb.).—See also Hemsley, l. c., Rehder & Wilson, l. c., Chung, l. c., and Maximowicz, l. c.

SHANTUNG: Lau shan, *F. N. Meyer*, nos. 278, 314, 382, August, 1907; Poa shan, *F. N. Meyer*, no. 262, September, 1907.—See also Loesener, l. c., Chung, l. c., and Meyer, l. c.

DISTRIBUTION: also Manchuria, Korea.

Evodia hupehensis Dode in Bull. Soc. Bot. France, LV. 707 (1908).—Rehder & Wilson in Sargent, Pl. Wilson. II. 133 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 12 (1922).—Chung in Mem. Sci. Soc. China, I. 124 (Cat. Trees Shrubs China) (1924).

Evodia Daniellii Pritzel in Bot. Jahrb. XXIX. 423 (1900), pro parte.—Non Hemsley.

HONAN: Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 543, May 24, 1919; Hwei hsien, Chung hu, *J. Hers*, no. 739, June 17, 1919; without precise locality, *J. Hers*, no. 3, 1918.

SHENSI: without precise locality, *G. Giraldi*, 1897; Ku san, *Hugh Scallan*, no. 75, about 1898; Mt. Miao nan san, *Hugh Scallan*, about 1898.—See also Rehder & Wilson, l. c., Chung, l. c., and Pritzel, l. c.

DISTRIBUTION: also Hupeh, southeastern Szechuan.

Evodia Henryi Dode in Bull. Soc. Bot. France, LV. 706 (1908).—Rehder & Wilson in Sargent, Pl. Wilson. II. 133 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 12 (1922).—Chung in Mem. Sci. Soc. China, I. 124 (Cat. Trees Shrubs China) (1924).

? *Zanthoxylum Danielli* Maximowicz in Act. Hort. Petrop. XI. 93 (1898).—Non Bennett.

Evodia Daniellii Pritzel in Bot. Jahrb. XXIX. 423 (1900), pro parte.—Non Hemsley.

Evodia rutaecarpa Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 71, no. 40719 (1918).—Non Bentham.

HONAN: Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. **1157**, September 21, 1919.—See also Hers, l. c.

SHANSI: Hsi po po, *F. N. Meyer*, no. 1871, July 10, 1914 (Herb. U. S. Dept. Agric.; sterile).

SHENSI: Houan ton shan, *Hugh Scallan*, about 1897; Tai pei shan, *W. Purdom*, no. 1038, in 1910; Tchan lien li, *F. N. Meyer*, no. 1929, September 17, 1914.—See also Rehder & Wilson, l. c., Chung, l. c., Pritzel, l. c., and Meyer, l. c.

? KANSU: on the river Hei ho above Dsun ka and at Kwang ting in gardens, *G. N. Potanin* (ex Maximowicz, l. c.).

DISTRIBUTION: also Hupeh and Szechuan.

The specimens collected by Potanin in Kansu and referred by Maximowicz to *Zanthoxylum Daniellii* hardly belong to Evodia Daniellii, but probably to either *E. hupehensis* or *E. Henryi* and more likely to the latter which we know extends in its variety *villicarpa* Rehd. & Wils. into western Szechuan.

Phellodendron amurense Ruprecht in Bull. Acad. Sci. St. Pétersb. XV. 526 (1857).—Franchet in Nouv.-Arch. Mus. Paris, sér. 2, v. 219 (Pl. David. I. 67) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 108 (1886).—Sargent, Trees & Shrubs I. 197, t. 93 (1905).—Sprague in Kew Bull. Misc. Inform. 1920, 234 (1920).—Chung in Mem. Sci. Soc. China, I. 125 (Cat. Trees Shrubs China) (1924).

CHILI: near Jehol (ex Franchet, l. c.).—See also Hemsley, l. c., Sargent, l. c., and Chung, l. c.

DISTRIBUTION: also Manchuria and Korea.

Poncirus trifoliata Rafinesque, Sylv. Tell. 143 (1838).—Swingle in Sargent, Pl. Wilson. II. 149 (1914).—Bailey, Gent. Herb. I. 33 (1920).—Hers, Liste Ess. Lign. Honan Sept. 22 (1922).—Chung in Mem. Sci. Soc. China, I. 127 (Cat. Trees Shrubs China) (1924).

Citrus trifoliata Linnaeus, Spec. ed. 2, 1101 (1763).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 219 (Pl. David. I. 67 (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 205 (Cat. Pl. Tché-fou) (1884).—Bretschneider, Hist. Eur. Bot. Discov. China, 851 (1898).—Pritzel in Bot. Jahrb. XXIX. 424 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in in Bot. Centralbl. Beih. XXXVIII. pt. II. 147 (1919).

Aegle sepiaria De Candolle, Prodr. I. 538 (1824).—Maximowicz in Act. Hort. Petrop. XI. 95 (1890).

SHANTUNG: Cou san, *F. N. Meyer*, no. 294, August, 1907; Chifu cultivated and subspontaneous (ex Franchet, l. c. [1884]) and Kiauchou district, cultivated (ex Loesener, l. c.).—See also Chung, l. c.

HONAN: Chikung shan and Kio shan, planted and "as if native" (ex Bailey, l. c.).—See also Hers, l. c.

SHENSI: Tai pei shan, *W. Purdom*, no. 1148 in 1910.—See also Swingle, l. c., Chung, l. c., Franchet, l. c. (1883), Bretschneider, l. c., Pritzel, l. c., and Maximowicz, l. c.

DISTRIBUTION: also cultivated in other provinces of China and in Japan; Korea.

According to most authors this species occurs only cultivated or escaped and subspontaneous in China, but Swingle (l. c.) considers it indigenous in northern China. As in the case of many other commonly cultivated plants it is almost impossible to distinguish between naturalized and spontaneous plants. Bailey (l. c.) collected it in the hill country near Kioshan, Honan and makes the statement "as if native but perhaps introduced."

Citrus Medica Linnaeus, Spec. 782 (1753).—Maximowicz in Act. Hort. Petrop. XI. 95 (1890).—Swingle in Sargent, Pl. Wilson. II. 95 (1914).

SHENSI: near Han tshun fu, cultivated, *P. J. Piasezki* (ex Maximowicz, l. c.).

DISTRIBUTION: southern China.

SIMAROUBACEAE

Picrasma quassioides Bennett, Pl. Jav. Rar. 198 (1844).—Hemsley in Jour. Linn. Soc. XXIII. 112 (1886).—Rehder & Wilson in Sargent, Pl. Wilson. II. 152 (1916).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan Sept. 21 (1922).—Chung in Mem. Sci. Soc. China, I. 127 (Cat. Trees Shrubs China) (1924).

Rhus ailanthoides Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Petersb. IX. 470 (Ind. Fl. Pekin.) (1859).

Picrasma ailanthoides Planchon in Lond. Jour. Bot. V. 573 (1846).—Bretschneider, Hist. Eur. Bot. Discov. China, 330 (1898).—Pritzel in Bot. Jahrb. XXIX. 425 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 147 (1919).

CHILI: Ying tau ho, *F. N. Meyer*, no. 1291, September 12, 1913; Siao Wu tai shan, alt. 900–1500 m., *J. Hers*, no. 2197, October 9, 1922.—See also Hemsley, l. c., Chung, l. c., Bunge, l. c., Maximowicz, l. c., and Bretschneider, l. c.

SHANTUNG: near Tsing tau, *R. Zimmermann*, no. 361, in 1901; Lau shan, *F. N. Meyer*, no. 312, August, 1906, Po shan, *F. N. Meyer*, no. 261, September, 1907; Chifu, *N. H. Cowdry*, no. 960, June 23, 1920.—See also Rehder & Wilson, l. c., Loesener, l. c., and Chung, l. c.

NORTHERN KIANGSU: Siao Hsien, Huang tsang yu, *J. Hers*, no. 1009, April 25, 1919; Liu lin shan, near Hai chow, *J. Hers*, no. 671, May 5, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers, no. 2285, October 8, 1922.

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 234, April 23, 1919; Yung ning, Tsi li ping, *J. Hers*, no. 440, May 22, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, nos. 582, 1252, and 1286,

May 26 and September 25, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1742, September 21, 1921.—See also Hers, l. c., and Chung, l. c.

SHANSI: Hai hsien, Huang lai kow, *J. Hers*, no. 1846, October 2, 1921.

SHENSI: Kinqua san and Lao y san, *G. Giraldi*, July and September, 1897; Ton sian fu, *Hugh Scallan* about 1898; northwest of Han chang hsien, Mou tan shan, *W. Purdom*, no. 362, in 1910; Lung chow, Sien fo shan, alt. 1000 m., *J. Hers*, no. 2325, July 2, 1922; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2354, July 3, 1924; Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2372, July 4, 1922.—See also Pritzel, l. c., Rehder & Wilson, l. c., and Chung, l. c.

DISTRIBUTION: throughout China; also Korea, Japan and southern Asia.

Ailanthus altissima Swingle in Jour. Wash. Acad. Sci. VI. 495 (1916).—Rehder & Wilson in Sargent, Pl. Wilson. III. 449 (1917).—Bailey, Gent. Herb. I. 34 (1920).—Chung in Mem. Sci. Soc. China, I. 127 (Cat. Trees Shrubs China) (1924).

Ailanthus glandulosa Desfontaines in Mém. Acad. Sci. Paris, 1786, 265, t. 8.—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859); Fl. Tangut. 107 (1889); in Act. Hort. Petrop. XI. 95 (1889).—Debeaux in Act. Soc. Linn. Bordeaux, XXXIII. 38 (Fl. Tien-tsin, 15) (1879).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 220 (Pl. David. I. 68) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 206 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 112 (1886).—Palibin in Act. Hort. Petrop. XIV. 113 (1895).—Bretschneider, Hist. Eur. Bot. Discov. China, 49, 51, 53, 126, 850 (1898).—Faber, Denkschr. Entwick. Kiautschou, 33 (1898).—Pritzel in Bot. Jahrb. XXIX. 425 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 147 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 2 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 161 (Pl. Peitaiho) (1922).

Ailanthus cacodendron Schinz & Tellung apud Thellung in Mém. Soc. Sci. Nat. Cherbourg, XXXVIII. 637, 679, (Fl. Av. Montpellier) (1912).—Rehder & Wilson, in Sargent, Pl. Wilson. II. 153 (1914).

CHILI: near Peking, *W. R. Carles*, no. 35, May 28, 1882 (Gray Herb.).—See also Bunge, l. c., Franchet, l. c. (1883), Chung, l. c., Turczaninov, l. c., Maximowicz, l. c., Debeaux, l. c., Hemsley, l. c., Palibin, l. c., Bretschneider, l. c., and Cowdry, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 374, in 1901.—See also Chung, l. c., Franchet, l. c. (1884), Hemsley, l. c., Faber, l. c., Loesener, l. c., and Rehder & Wilson, l. c. (1914).

HONAN: Chi kung shan (ex Bailey, l. c.).—See also Chung, l. c., and Hers, l. c.

SHENSI: Kan y san, *G. Giraldi*, June 11–12, 1897 (mixed with *Cedrela sinensis*).—See also Pritzel, l. c.

KANSU: near Lid sha pu on the river Pei shiu, *G. N. Potanin* (ex Maximowicz, l. c. [1889]).

DISTRIBUTION: throughout China; southern Manchuria.

Ailanthus Giraldii Dode in Bull. Soc. Dendr. France, 1907, 191, fig.

SHENSI: without precise locality or collector (ex Dode, l. c.).

Dode's description is apparently based partly on a specimen collected by Farges in eastern Szechuan and on cultivated plants. A plant received as *A. Giraldii* from France and growing in this Arboretum agrees in some respects with Dode's description, but the only specimen from Shensi I have seen does not differ from *A. altissima* under which it is cited above. With the incomplete material at hand I am unable to form any opinion whether *A. Giraldii* is specifically distinct from *A. altissima*.

MELIACEAE

Cedrela sinensis A. L. de Jussieu in Mém. Mus. Nat. Hist. Paris, XIX. 255, 294 (1830).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859).—David, Jour. Trois. Voy. Emp. Chin. I. 154 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 220 (Pl. David. I. 68) (1883), sub *C. chinensis*.—Hemsley in Jour. Linn. Soc. XXIII. 114 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 51, 53, 829, 850 (1898).—Hers in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan Sept. 6 (1922).—Chung in Mem. Sci. Soc. China, I. 128 (Cat. Trees Shrubs China) (1924).

Toona sinensis Roemer, Fam. Nat. Syn. I. 139 (1846).—Pritzel in Bot. Jahrb. XXXVI. beibl. LXXXII. 71 (1905).

CHILI: Peking, *C. A. Skatschkoff*, about 1850 (Gray Herb.); near San tung ying, *F. N. Meyer*, no. 964, May 29, 1913.—See also Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., Bretschneider, l. c., and Chung, l. c.

HONAN: cultivated (ex Hers, l. c.).

SHENSI: Kan y san, *G. Giraldi*, June 11–12, 1897.—See also David, l. c., Bretschneider, l. c. 850, and Pritzel, l. c.

KANSU: "beyond the Great Wall, *Piasezki* ex Maximowicz" (ex Hemsley, l. c.).

DISTRIBUTION: throughout China; southern Manchuria.

Melia Azedarach Linnaeus, Spec. I. 384 (1753).—David, Jour. Trois. Voy. Emp. Chin. I. 65 (1875).—Hemsley in Jour. Linn. Soc. XXIII. 113 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 849 (1898).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Pritzel in Bot. Jahrb. XXIX. 426 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 47 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 148 (1904).—Rehder & Wilson in Sargent, Pl. Wilson. II. 157 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan Sept. 19 (1922).—Chung in Mem. Sci. Soc. China, I. 128 (Cat. Trees Shrubs China) (1924).

Melia japonica G. Don, Gen. Syst. I. 680 (1831).—Maximowicz in Act. Hort. Petrop. XI. 96 (1890).

HONAN: near Feng lo cheng (ex David, l. c.).—See also Bretschneider, l. c., and Hers, l. c.

SHANTUNG: Kiauchou district (ex Faber, l. c., and Loesener, l. c.).—See also Chung, l. c.

SHENSI: Lao y san, *Hugh Scallan*, about 1897; Han cheng hsien, *W. Purdom*, no. 321, in 1910.—See also Hemsley, l. c., Pritzel, l. c., Rehder & Wilson, l. c., Chung, l. c., and Maximowicz, l. c.

DISTRIBUTION: throughout China; Korea, Japan, India; much planted and frequently naturalized in all subtropical countries.

POLYGALACEAE

Polygala sibirica Linnaeus, Spec. 702 (1753). This plant which has been reported from Chili, Shantung and Honan and is widely distributed throughout eastern Asia from Siberia to India, can scarcely be considered woody or suffruticose, though it has been included in some lists of ligneous plants.

EUPHORBIACEAE

Andrachne chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 133 (Enum. Pl. Chin. Bor. 59) (1853).—Turczaninov in Bull. Soc. Nat. Moscou, x. pt. VII. 157 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 477 (Ind. Fl. Pekin.) (1859).—Mueller Arg. in De Candolle, Prodr. XV. pt. II. 234 (1866).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 75 (Pl. David. I. 265) (1884).—Hemsley in Jour. Linn. Soc. XXVI. (1894).—Pax & K. Hoffmann in Engler, Pflanzenr. IV. 147, XV. 171 (1922).—Chung in Mem. Sci. Soc. China, I. 130 (Cat. Trees Shrubs China) (1924).

Andrachne capillipes Hutchinson in Sargent, Pl. Wilson. II. 516 (1916).—Chung in Mem. Sci. Soc. China, I. 130 (Cat. Trees Shrubs China) (1924).

CHILI: near Peking *F. N. Meyer*, no. 391, May, 1907; hills near Peking, *S. W. Williams*, August, 1865, Herb. Hance 11449 (Gray Herb.); near San tun ying, *F. N. Meyer*, nos. 979, 988, June 1 and 2, 1913; western hills near Peking, *W. R. Carles*, no. 184, July, 1882 (Gray Herb.), *W. Purdom*, no. 1079, April 30, 1912, *J. Hers*, no. 1612, August 21, 1921; Po hua shan, *J. Hers*, nos. 1457, 1667, July 1 and September 9, 1921; Siao Wu tai shan, *J. Hers*, no. 1468, July 14, 1921; Men tow kow, side of artificial water way, *N. H. Coudry*, no. 484, June 8, 1920; Kalgan, mountain sides, *N. H. Coudry*, no. 1401, June 4, 1921.—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Mueller Arg., l. c., Franchet, l. c., Hemsley, l. c., Pax & K. Hoffmann, l. c., and Chung, l. c.

SHANTUNG: near Tsing-tau, *F. N. Meyer*, no. 243, September, 1907.—See also Pax & K. Hoffmann, l. c.

HONAN: Sia shih, *J. Hers*, no. 347, May 25, 1921; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2657, August 22, 1923.

SHENSI: Tai pei shan, *W. Purdom*, nos. 881 and 881a, in 1910.—See also Pax & K. Hoffmann, l. c., and Chung, l. c.

DISTRIBUTION: also central and western China.

Purdom's no. 881a is perfectly glabrous, but in no. 881 the under side

of the young leaves is thinly covered with short curled hairs which later partly disappear. The latter plant approaches *A. capillipes* var. *pubescens* Hutchinson (l. c.) which has, however, a denser pubescence of longer hairs. Also Hers no. 2657 from Honan is slightly pubescent on the under side of the leaves and on the sepals and is very similar to Hers no. 2572 enumerated under *A. hirsuta*, but it has a perfectly glabrous ovary.

Andrachne hirsuta Hutchinson in Sargent, Pl. Wilson. II. 516 (1916).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan Sept. 3 (1922).—Chung in Mem. Sci. Soc. China, I. 130 (Cat. Trees Shrubs China) (1924).

Andrachne capillipes Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, Sept. 3 (1922).—Non Hutchinson.

HONAN: Mien chih, alt. 800 m., *J. Hers*, no. 66, August 20, 1919; Teng feng hsien Yu tai shan, alt. 800 m., *J. Hers*, no. 250, April 23, 1919; from a shrub obtained on the Yu tai shan, *J. Hers*, no. 310, April 20, 1920; Chengchow nursery, from Sung shan, *J. Hers*, no. 335, May 1, 1913; Chengchow, introduced from the hills, *J. Hers*, no. 2572, August 2, 1923.

Hers' nos. 66, 335 and 2572 represent apparently a glabrescent form of *A. hirsuta*; the branchlets are glabrescent (villose in no. 335) and the leaves are generally ovate and obtuse and only slightly pubescent on the under side, but the sepals are suborbicular and slightly pubescent outside and the ovary and fruit are sparingly appressed-pilose as in *A. hirsuta*; in no. 2572, however, the pubescence of the ovary is very slight and the plant is scarcely distinguishable from no. 2657 enumerated under *A. chinensis*.

Securinega ramiflora Mueller Arg. in De Candolle, Prodr. XV. pt. II. 449 (1866).—Hemsley in Jour. Linn. Soc. XXVI. 426 (1894).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 148 (1919).—Chung in Mem. Sci. Soc. China, I. 130 (Cat. Trees Shrubs China) (1924).

Phyllanthus ramiflorus Persoon, Syn. II. 591 (1807).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 123 (Enum. Pl. Chin. Bor. 59) (1833).

Geblera suffruticosa Fischer & Meyer in Ind. Sem. Hort. Petrop. 1835, 28.—Turczaninov in Bull. Soc. Nat. Msocou, X. pt. VII. 157 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 477 (Ind. Fl. Pekin) (1859).

Flueggea suffruticosa Baillon, Etude Gén. Euphorb. 592 (1858).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 76 (Pl. David. I. 266) (1884); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 252 (Cat. Pl. Tché-fou) (1884).

Securinega flueggeoides Mueller Arg. in De Candolle, Prodr. XV. pt. II. 499 (1866).—Bailey, Gent. Herb. I. 34 (1920).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 173 (1922).—Chung in Mem. Sci. Soc. China, I. 130 (Cat. Trees Shrubs China) (1924).

CHILI: near Peking, *O. Warburg*, no. 6357; near Weichang, *W. Purdom*, nos. 111 and 880 in 1909; Nan kow pass, *J. Hers*, no. 1606, August 15, 1921; Ming Tombs, *J. Hers*, no. 1594, August 14, 1921; Siao Wu tai shan, *J. Hers*, no. 1524, July 14, 1921; Siao Wu tai shan, Shui Shih tao and southeastern valley, alt. 900 1500 m., *J. Hers*, nos. 2167 and

2199, October 8 and 9, 1922.—See also Mueller Arg., l. c., Hemsley, l. c., Chung, l. c., Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c. (Pl. David.), and Cowdry, l. c.

SHANTUNG: near Black Dragon temple, Chifu, *N. H. Cowdry*, no. 595, July 19, 1920.—See also Hemsley, l. c., Loesener, l. c., Chung, l. c., and Franchet, l. c. (Cat. Pl. Tché-fou).

HONAN: near Kio shan and on Chi kung shan (ex Bailey, l. c.).

KANSU: Ho lan shan mountains, alt. 1375–2400 m., *R. C. Ching*, no. 193, May 10–25, 1923.

DISTRIBUTION: also Kiangsu, Kiangsi, Hupeh, Korea, Japan.

Phyllanthus simplex Retzius, Observ. Bot. V. 29 (1789).—Mueller Arg. in De Candolle, Prodr. XV. pt. II. 391 (1866).—Hemsley in Jour. Linn. Soc. XXVI. 423 (1894).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 48 (1904); in Bot. Centrabl. Beih. XXXVII. pt. II. 148 (1919).—Chung in Mem. Sci. Soc. China, I. 131 (Cat. Trees Shrubs China) (1924).

Phyllanthus ussuriensis Ruprecht mss. apud Regel in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 222 (Maximowicz & Regel, Veget. Skizz. Amurl.) (1857); in Mél. Biol. II. 490 (1857).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 251 (Cat. Pl. Tché-fou) (1884).

CHILI: near Peking (ex Hemsley, l. c.).—See also Chung, l. c.

SHANTUNG: near Chifu (ex Hemsley, l. c., and Franchet, l. c.) and near Tsing tau (ex Loesener, l. c.).—See also Faber, l. c., and Chung, l. c.

DISTRIBUTION: also Kiangsu, Kiangsi, Hupeh, Kwangtung; Manchuria, Mongolia, Japan, southern Asia, Malaysia and Polynesia.

According to the material I have seen this species can hardly be called woody, the stems seem to be lignescent only at their base.

Glochidion puberum Hutchinson in Sargent, Pl. Wilson. II. 518 (1916).

Glochidion obscurum Hemsley in Jour. Linn. Soc. XXVI. 425 (1894).—Non Blume.

? *Glochidion* sp. Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 148 (1904).

SHANTUNG: without locality (ex Faber, l. c., and Loesener, l. c.);

NORTHERN KIANGSU: Suchow fu, Huang tsang yu, *J. Hers*, nos. 2465 and 2806, October 3, 1922 and October 15, 1923.

DISTRIBUTION: also Chekiang, Kiangsi, Fokien, Kwangtung, Hupeh.

The Glochidion recorded from Shantung by Faber, if the record is correct, is probably *G. puberum* as this species extends to northern Kiangsu which is farther north than any other species of the genus.

Mallotus apelta Mueller Arg. in De Candolle, Prodr. XV. pt. II. 963 (1866).—Bailey, Gent. Herb. I. 34 (1920).

HONAN: Chi kung shan (ex Bailey, l. c.).

DISTRIBUTION: eastern and central China.

Alchornea Davidi Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 74, t. 6 (Pl. David. I. 264) (1884).—Hers in Jour. N. China Branch R.

As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 3 (1922).—Chung in Mem. Sci. Soc. China, I. 134 (Cat. Trees Shrubs China) (1924).

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 235, April 13, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2647, August 22, 1923.—See also Hers, l. c.

SHENSI: southern Shensi, on hills (ex David, l. c.).

DISTRIBUTION: also Chekiang and Hupeh.

Alchornea rufescens Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 75, t. 7 (Pl. David. I. 265) (1884).—Chung in Mem. Sci. Soc. China I. 134 (Cat. Trees Shrubs China) (1924).

Alchornea Giraldii Pax in Bot. Jahrb. XXIX. 429 (1900).

SHENSI: several localities (ex David. l. c., and Pax, l. c.).

DISTRIBUTION: also Hupeh, Szechuan, Fukien, Kwangtung.

Sapium japonicum Pax & K. Hoffmann in Engler, Pflanzenr. IV. -147, V. 252 (1912).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 148 (1919).—Chung in Mem. Sci. China, I. 135 (Cat. Trees Shrubs China) (1924).

Excoecaria japonica Mueller Arg. in Linnaea, XXXII. 123 (1863).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 48 (1904).

SHANTUNG: Lau shan, *F. N. Meyer*, nos. 283, 297, 323, August, 1907; Tai ching kung, planted in temple grounds, *R. Zimmermann*, no. 634, in 1901.—See also Pax & K. Hoffmann, l. c., Loesener, l. c., and Chung, l. c.

DISTRIBUTION: eastern and central China; Korea, Japan.

Sapium sebiferum Roxburgh, Fl. Ind. ed. 2, III. 693 (1892).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Pax in Bot. Jahrb. XXIX. 430 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 48 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 148 (1919).—Pax & K. Hoffmann in Engler, Pflanzenr. IV.-147, V. 237 (1912).—Bailey, Gent. Herb. I. 34 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess Lign. Honan Sept. 28 (1922).—Chung in Mem. Sci. Soc. China, I. 136 (Cat. Trees Shrubs China) (1924).

SHANTUNG: without precise locality (ex Faber, l. c., and Loesener, l. c. [1904]); Tsingtau, planted (ex Loesener, l. c. [1919]).—See also Chung, l. c.

NORTHERN KIANGSU: Suchow fu, Huang tsang yu, alt. 200 m. *J. Hers*, no. 2464, October 3, 1922.

HONAN: Teng feng, Yu tai shan, *J. Hers*, no. 304, June 17, 1919.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHENSI: Lean shan, *G. Giraldi* (ex Pax, l. c., and Pax & K. Hoffmann, l. c.).

DISTRIBUTION: eastern and central China; southern Asia; cultivated and often naturalized in tropical and subtropical countries.

BUXACEAE

Buxus microphylla Sieb. & Zucc. var. **sinica** Rehder & Wilson in Sargent, Pl. Wilson, II. 165 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan Sept. 5 (1922).—Chung in Mem. Sci. Soc. China, I. 137 (Cat. Trees Shrubs China) (1924).

Buxus sempervirens Hemsley in Jour. Linn. Soc. XXVI. 418 (1894), pro parte.—Diels in Bot. Jahrb. XXIX. 431 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 49 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 150 (1919).—Non Linnaeus.

SHANTUNG: Cape Ya tau, near Tai ching kung, *R. Zimmermann*, no. 529 in 1901.—See also Rehder & Wilson, l. c., and Loesener, l. c.

HONAN: Siao hsien, Huang tsang yu, cultivated, *J. Hers*, no. 1028, May 26, 1919.—See also Hers, l. c.

SHENSI: Tai pei shan, *W. Purdom*, nos. 1149 and 1150, in 1910; without precise locality, *W. Purdom*, no. 1151, in 1910.—See also Rehder & Wilson, l. c., Chung, l. c., and Diels, l. c.

KANSU: mountains near Siku, *F. N. Meyer*, no. 2009, November 17, 1914.—See also Chung, l. c.

DISTRIBUTION: also Kiangsu, Chekiang, Kiangsi, Hupeh, Yunnan; Formosa.

CORIARIACEAE

Coriaria sinica Maximowicz in Mém. Acad. Sci. St. Pétersb. XXIX. no. III. 9, fig. (p. 13) (1881); in Act. Hort. Petrop. XI. 112 (1889).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 69, no. 40706 (1918).—Chung in Mem. Sci. Soc. China, I. 137 (Cat. Trees Shrubs China) (1924).

Coriaria nepalensis Hemsley in Jour. Linn. Soc. XXIII. 149 (1886).—Diels in Bot. Jahrb. XXIX. 431 (1900).—Non Wallich.

SHENSI: several localities, *P. J. Piasezki* (ex Maximowicz, l. c.).—See also Hemsley, l. c., and Chung, l. c.

KANSU: Yin kwan dien, *F. N. Meyer*, no. 1739, September 23, 1914; Yang dja dien, *F. N. Meyer*, no. 1944, September 23, 1914; Yan pu ko, *F. N. Meyer*, no. 1961, October 6, 1914, (all in Herb. U. S. Dept. Agric.).—See also Hemsley, l. c., Meyer, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

ANACARDIACEAE

Pistacia chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. XI. 110 (1889).—Engler in De Candolle, Monog. Phaner. IV. 291 (1883).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 231 (Pl. David. I. 79) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 208 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 148 (1886).—Bretschneider,

Hist. Eur. Bot. Discov. China, 331, 849 (1898), as sinensis.—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Diels in Bot. Jahrb. XXIX. 431 (1900); XXXVI. beibl. LXXXII. 71 (1905).—Rehder & Wilson in Sargent, Pl. Wilson. II. 173 (1914).—Meyer in U. S. Dept. of Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 62, no. 40662 (1918).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 150 (1919).—Bailey, Gent. Herb. I. 34 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan Sept. 21 (1922).—Chung in Mem. Sci. Soc. China, I. 138 (Cat. Trees Shrubs China) (1924).

CHILI: Peking, *A. Bunge* (Gray Herb.); *F. N. Meyer*, no. 181, October, 1905; Po hua shan, *J. Hers*, no. 1388, May 1, 1921; without precise locality, *Père Chanet*, no. 77 in 1919.—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c. (1859), Engler, l. c., Franchet, l. c. (1883), Hemsley, l. c., Bretschneider, l. c. 331, Rehder, & Wilson, l. c., and Chung, l. c.

SHANTUNG: graveyard east of Chifu, *N. H. Cowdry*, no. 575, July 5, 1920.—See also Franchet, l. c. (1884), Hemsley, l. c., Faber, l. c., Rehder & Wilson, l. c., Loesener, l. c., (1919) and Chung, l. c.

NORTHERN KIANGSU: Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers, no. 2296, October, 8, 1922.

HONAN: Ho dien, *F. N. Meyer*, no. 1856, July 4, 1914; (Herb. U. S. Dept. Agric.); Kio shan, *L. H. Bailey*, in 1917.—See also David, l. c., Bretschneider, l. c,. 849, Bailey, l. c., Hers, l. c., and Chung, l. c.

SHENSI: Lean san, *Hugh Scallan*; Tai pei shan, *W. Purdom*, no. 1152, in 1910; Kwan yin tang. *F. N. Meyer*, no. 1735, September 15, 1914 (Herb. U. S. Dept. Agric.); Lung chow, Sien fo shan, alt. 1000 m., *J. Hers*, no. 2330, July 2, 1922.—See also Maximowicz, l. c. (1889), Engler, l. c., Hemsley, l. c., Diels, l. c., Rehder & Wilson, l. c., Meyer, l. c., and Chung, l. c.

KANSU: Yu yin chen, *F. N. Meyer*, no. 1684, September 25, 1914 (Herb. U. S. Dept. Agric.);

DISTRIBUTION: throughout China, also Formosa and Philippine Islands.

Pistacia chinensis forma **latifoliolata** Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 49 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 49 (1919).

SHANTUNG: Lau shan, *F. N. Meyer*, no. 315, August, 1907.—See also Loesener, l. c.

Cotinus coggygria Scop. var. **pubescens** Engler in Bot. Jahrb. I. 403 (1881); in De Candolle, Monog. Phaner. IV. 350 (1883).—Rehder & Wilson in Sargent, Pl. Wilson. II. 175 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan Sept. 9 (1922).—Chung in Mem. Sci. Soc. China, I. 138 (Cat. Trees Shrubs China) (1924).

Rhus Cotinus Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. China. Bor. 15) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X.

pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Hemsley in Jour. Linn. Soc. XXIII. 146 (1886), pro parte quoad specim. e Shensi.—Maximowicz in Act. Hort. Petrop. XI. 110 (1889).—Non Linnaeus.

Cotinus coggygria Diels in Bot. Jahrb. XXIX. 432 (1900); XXXVI. beibl. LXXXII. 71 (1905).—Non Scopoli.

HONAN: Yungning, Tsi li ping, *J. Hers*, no. 450, May 22, 1919; Tsi yuan hsien, Tientan shan, *J. Hers*, no. 1706, September 18, 1921.—See also Hers, l. c., and Chung, l. c.

SHANSI: Ping yang fu, *F. N. Meyer*, in 1711, July 25, 1914 (Herb. U. S. Dept. Agric.); Hia hsien, Huang lai kow, *J. Hers*, no. 1857, October 2, 1921.

SHENSI: Huo kia zaez, *G. Giraldi*, July 16, 1897; northwest of Han chang fu, *W. Purdom*, nos. 364, 1105, in 1910; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2341, July 3, 1922; Tsing ling, 60 kilom. south of Sian fu, alt. 1000–1500 m., *J. Hers*, no. 2948, October 20, 1924; Hua Shan, alt. 1000–1500 m., *J. Hers*, nos. 3061 and 3098, October 31, 1924.—See also Rehder & Wilson, l. c., Hemsley, l. c., Maximowicz, l. c., and Chung, l. c.

KANSU: Lidsha pu, *P. J. Piasezki* (ex Maximowicz, l. c.).

DISTRIBUTION: also Hupeh and Chekiang; southeastern Europe to central Asia.

The Chinese specimens vary greatly in the amount of pubescence; in some, as in the Shensi specimens the pubescence is reduced to the axils of the veins or along the lower part of the midrib; these specimens might possibly be called as well typical *R. coggygria* (var. *laevis* Engl. l. c.), while others, as Wilson's no. 87 from Hupeh, approach var. *cinerea* Engl.

Cotinus coggygria var. **cinerea** Engler in Bot. Jahrb. I. 403 (1881); in De Candolle, Monog. Phaner. IV. 351 (1883).—Rehder & Wilson in Sargent, Pl. Wilson. II. 176 (1914).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 434 (1922).—Chung in Mem. Sci. Soc. China, I. 138 (Cat. Trees Shrubs China) (1924).

Rhus Cotinus Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 230 (Pl. David. I. 78) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 146 (1886), pro parte, quoad specim. e Chili.—Non Linnaeus.

Rhus sp. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XIV. 46, no. 22, 346 (1909).

CHILI: near Peking, *S. W. Williams*, Herb. Hance no. 12008, August, 1865 (Gray Herb.), *F. N. Meyer*, no. 389, May, 1907; Ying tau ko, *F. N. Meyer*, no. 1017, September 12, 1913; western hills near Peking, *J. Hers*, no. 1395, May 15, 1921; Po hua shan, *J. Hers*, no. 1408, May 1, 1921; Siao Wu tai shan, *J. Hers*, no. 1485, July 14, 1921; Trappish Monastery, *N. H. Cowdry*, no. 1672, July 16, 1921.—See also Engler, l. c. (1883), Rehder & Wilson, l. c., Limpricht, l. c., Chung, l. c., Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., and Meyer, l. c.

SHANTUNG: near Tsing tau, *F. N. Meyer*, no. 255, September, 1907.—See also Rehder & Wilson, l. c., and Chung, l. c.

HONAN: Ho dien, *F. N. Meyer*, no. 1862, July 7, 1914.

DISTRIBUTION: also southeastern Europe.

Rhus punjabensis Stewart var. **sinica** Rehder & Wilson in Sargent, Pl. Wilson. II. 176 (1914).

Rhus sinica Diels in Bot. Jahrb. XXIX. 432 (1900).

SHENSI: Lu tun, *G. Giraldi*, no. 1271 (ex Diels, l. c.).

DISTRIBUTION: also Hupeh and Szechuan.

Rhus Potanini Maximowicz in Act. Hort. Petrop. XI. 110 (1889).—Bretschneider, Hist. Eur. Bot. Discov. China, 1027 (1898).—Diels in Bot. Jahrb. XXIX. 432 (1900); XXXVI. beibl. LXXXII. 71 (1905).—Rehder & Wilson in Sargent, Pl. Wilson. II. 177 (1914).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 71, no. 40717 (1918).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan Sept. 26 (1922).—Chung in Mem. Sci. Soc. China, I. 177 (Cat. Trees Shrubs China) (1924).

HONAN: Yung ning, Tsi li ping, *J. Hers*, no. 433, May 22, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 834, October 5, 1919; Hwei hsien, Chung hu, *J. Hers*, no. 736, June 17, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1723 and 1811, September 20 and 21, 1921.—See also Hers, l. c., and Chung, l. c.

SHENSI: "Monte Kin-qua-san," *G. Giraldi*, July 10, 1897; "Monte Qua-in-san," *G. Giraldi*, July 16, 1897; 'Thui-kio-tsuen," *G. Giraldi*, September 25, 1897; Tai pei shan, *W. Purdom*, no. 1106, in 1910; Kwang yin tang, *F. N. Meyer*, nos. 1910, 1913, September 15, 1914; Niu pei shan, alt. 700 m., *J. Hers*, no. 2451, October 11, 1922; Tsing ling shan, 60 kilom. south of Sian fu, alt. 1000-1500 m., *J. Hers*, no. 2946, October 20, 1924.—See also Diels, l. c., Rehder & Wilson, l. c., and Chung, l. c.

KANSU: above Terga on the Hei ho, *G. N. Potanin* (ex Maximowicz, l. c.).—See also Bretschneider, l. c.

Rhus javanica Linnaeus, Spec. 265 (1753).—Rehder & Wilson in Sargent, Pl. Wilson. II. 178 (1914).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XLIII. 71, no. 40716 (1918).—Bailey, Gent. Herb. I. 34 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan Sept. 26 (1922).—Chung in Mem. Sci. Soc. China, I. 138 (Cat. Trees Shrubs China) (1924).

Rhus chinensis Osbeck, Dagb. Ostind. Resa, 232 (1757).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).

Rhus semialata Murray in Comm. Soc. Goetting. VI. 27, t. 3 (1784).—Hemsley in Jour. Linn. Soc. XXIII. 146 (1886).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Diels in Bot. Jahrb. XXIX. 433 (1900).—Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 49 (1904).

Rhus semialata β. *Osbeckii* De Candolle, Prodr. II. 67 (1825).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 230 (Pl. David. I. 78) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXXIV. 208 (Cat. Pl. Tché-fou) (1884).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 150 (1919).

Rhus semialata β. *Roxburghii* Engler in De Candolle, Monog. Phaner. IV 381 (1883).—Non De Candolle.

CHILI: passes near Hsing ling Mts., *N. H. Cowdry*, no. 1684, July 19, 1921 (Herb. Cowdry).—See also Maximowiez, l. c., Hemsley, l. c., Franchet, l. c. (1883), Engler, l. c., and Chung, l. c.

SHANTUNG: Lau shan, *F. N. Meyer*, no. 286, August, 1907 (Herb. U. S. Dept. Agric.).—See also Franchet, l. c., Faber, l. c., Hemsley, l. c., Loesener, l. c., and Chung, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 640, May 5, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2320, October 8, 1922.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1849, October 2, 1921.

HONAN: Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 507, May 24, 1919; without precise locality, *J. Hers*, no. 10, in 1918.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHENSI: Miao wang san, *Hugh Scallan*, July, 1899; King lung shan, alt. 900 m., *J. Hers*, no. 2439, October 9, 1922; Hua shan, alt. 1000–1500 m., *J. Hers*, no. 3092, October, 31, 1924.—See also Rehder & Wilson, l. c., Chung, l. c., Hemsley, l. c., and Diels, l. c.

KANSU: near Yuyinchen, *F. N. Meyer*, no. 1955, September 25, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: throughout China; Korea, Japan, Formosa, India.

Rhus sylvestris Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. III. 140 (Fl. Jap. Fam. Nat. II. 32) (1846).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 71 (1905).

SHENSI: several localities, *G. Giraldi* (ex Diels, l. c.).

DISTRIBUTION: eastern and central China; Korea, Japan.

Rhus verniciflua Stokes, Bot. Mat. Med. II. 164 (1812).—Rehder & Wilson in Sargent, Pl. Wilson. II. 181 (1914).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan Sept. 26 (1922).—Chung in Mem. Sci. Soc. China, I. 139 (Cat. Trees & Shrubs China) (1924)

Rhus vernicifera De Candolle, Prodr. II. 68 (1825).—Hemsley in Jour. Linn. Soc. XXIII. 148 (1886).—Maximowiez in Act. Hort. Petrop. XI. 110 (1889).—Diels in Bot. Jahrb. XXIX. 433 (1900).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 150 (1919).

CHILI: without precise locality, *Père Chanet*, no. 67, in 1919.

SHANTUNG: Cape Ya tau (ex Loesener, l. c.).—See also Chung, l. c.

HONAN: without precise locality (ex Hers, l. c.).

SHENSI: Tai pei shan, *W. Purdom*, no. 1153, in 1910; Kwan yin tang, *F. N. Meyer*, no. 1909, September 15, 1914.—See also Rehder & Wilson, l. c., Chung, l. c., Maximowiez, l. c., and Diels, l. c.

DISTRIBUTION: also eastern to western China; India, cultivated in Korea and Japan.

Rhus succedanea Linnaeus, Mant. 221 (1771).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 208 (Cat. Pl. Tché-fou) (1884).

Rhus succedanea α *japonica* Engler in De Candolle, Monog. Phaner. IV. 399 (1883).

CHILI: Jehol, *A. David* (ex Engler, l. c.).

SHANTUNG: Chifu, *Fauvel* (ex Franchet, l. c.).

DISTRIBUTION: eastern to western China; Japan, India.

The occurrence of this species in Chili and Shantung is doubtful. Franchet in Plantae Davidianae mentions only a specimen from Kiangsi and Fauvel's specimen from Chifu may belong to the preceding species.

Rhus sp.

SHENSI: Fu niu shan, *J. Hers*, no. 166, October 6, 1918; Hua shan, alt. 1500 m., *J. Hers*, no. 3114, October 31, 1924.

The specimens are unfortunately sterile and cannot be referred to any Chinese species known to me, though they seem to be most nearly related to *R. punjabensis* var. *sinica*. The branchlets are slightly puberulous and yellowish; the leaves have a slender rhachis terete or only very narrowly winged between the upper pairs of leaflets; the latter are ovate to oblong-ovate, 3.5–8 cm. long, subsessile, with 1–5 teeth on each side or occasionally entire on one side and they are pubescent on both sides with short accumbent lustrous hairs denser beneath.

Probably not a Rhus at all in Rhus sp. Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 803 (Pl. Enum. 15) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 691 (1889). Only sterile branches collected in Kansu are present and are described "foliis fere semper 16-jugis . . . foliolis tenuibus . . . costis et nervis glabris . . . lanceolatis." I do not know any Rhus with as many leaflets and I suspect that the specimen may belong to Ailanthus or Cedrela.

AQUIFOLIACEAE

Ilex yunnanensis Franchet in Pl. Delavay. II. 128 (1899).—Loesener in Nov. Act. Leop.-Carol. LXXVIII. 131 (Monog. Aquifol.) (1901).

SHENSI: Tai pei shan, *W. Purdom*, no. 1114, in 1910.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Ilex Pernyi Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 221 (Pl. David. I. 69) (1883).—Oliver in Hooker's Icon. XVI. t. 1539 (1886).—Hemsley in Jour. Linn. Soc. XXIII. 117 (1886).—Maximowicz in Act. Hort. Petrop. XI. 96 (1889).—Loesener in Nov. Act. Leop.-Carol. LXXVIII. 278 (Monog. Aquifol.) (1901).—Farrer in Jour. Roy. Hort. Soc. XLII. 77 (1916).—Chung in Mem. Sci. Soc. China, I. 141 (Cat. Trees Shrubs China) (1924).

SHENSI: Tsin ling shan, *A. David* (ex Franchet, l. c.).—See also Oliver l. c., Hemsley, l. c., Loesener, l. c., and Chung, l. c.

KANSU: Hoi sian, *M. M. Beresowski* (ex Maximowiez, l. c.).—See also Farrer, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh, Kweichou, Szechuan, Yunnan.

CELASTRACEAE

Evonymus nana Marschall Bieberstein, Fl. Taur.-Cauc. III. 160 (1819).—Maximowiez in Mél. Biol. XI. 195 (1881); in Bull Acad. Sci. St. Pétersb. XXVII. 452 (1882); Fl. Tangut. 108 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 120 (1886).—Loesener in Bot. Jahrb. XXX. 452 (1902). Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

SHENSI: Hua juen shen, *G. Giraldi*, no. 1149 (ex Loesener, l. c.).

KANSU: on the Tetung river, alt. 2300 m. (ex Maximowiez, l. c.).

DISTRIBUTION: also Mongolia, Turkestan, Caucasus, Bessarabia.

Evonymus alata Regel, Tent. Fl. Ussur. 40, t. 7, fig. 124 (1861).—Franchet, in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 206 (1884).—Loesener in Bot. Jahrb. XXIX. 444 (1900); in Bot. Centralbl. Beih. XXXVII. pt. II. 151 (1919).—Loesener & Rehder in Sargent, Pl. Wilson. I. 493 (1913).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XXXVIII. 63, no. 37479 (1917).—Bailey, Gent. Herb. I. 35 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 12, (1922).—Chung in Mem. Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924).

Evonymus Thunbergiana Blume, Bijdr. Fl. Ned. Ind. 1147 (1825).—Hance in Jour. Bot. XIII. 131 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 222 (Pl. David. I. 70) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 121 (1886).—Maximowicz, Fl. Tangut. 109 (1889); in Act. Hort. Petrop. XI. 97 (1889).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).

Evonymus alatus var. *ciliato-dentatus* Franchet & Savatier, Enum. Pl. Jap. II. 312 (1879).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 222 (Pl. David. I. 70) (1883).

Evonymus striata Loesener in Bot. Jahrb. XXX. 444 (1902); XXXIV. beibl. LXXV. 49 (1904).

Evonymus alata var. *aperta* Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1912); Liste Ess. Lign. Honan Sept. 12 (1922).—Non Loesener.

CHILI: east of Weichang, *W. Purdom*, nos. 4, 1013, in 1909; Hsiao, Wu tai shan, *F. N. Meyer*, no. 1354, August 27, 1913.—See also Loesener & Rehder, l. c., Chung, l. c., Hance, l. c., Franchet, l. c. (1883), and Loesener, l. c. (1902).

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 184; near Chifu, rocks in high hills, *N. H. Cowdry*, no. 566, July, 1920.—See also Franchet, l. c. (1884), Loesener, l. c. (1902, 1904, 1919), Loesener & Rehder, l. c., Chung, l. c., and Faber, l. c.

NORTHERN KIANGSU: Huang tsang yu, *J. Hers*, no. 1036, May 26, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2281, October 8, 1922.

HONAN: Hwei hsien, Shansi border, *J. Hers*, no. 766, June 19, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2650, August 22, 1923; Tsi

yuan hsien, Pei ting shan, alt. 1200 m., *J. Hers*, no. 2803, October 10, 1923; Cheng chow nursery, "common in Honan," *J. Hers*, no. 333, April 24, 1921.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHANSI: near Kiu hsiang, *F. N. Meyer*, no. 1884, July 23, 1914.

SHENSI: "Huo-kio-zay," *G. Giraldi*, July 16, 1897; "Mte. Kin quasan," *G. Giraldi*, July, 1897; "Thui-kio-tsuen," *G. Giraldi*, October 9, 1897; "Lao-y-san," *G. Giraldi*, without date; Tai pei shan, *W. Purdom*, nos. 9 and 14, in 1910; Yenan fu, *W. Purdom*, no. 342, in 1910; northwest of Han chung hsien, *W. Purdom*, no. 375, in 1910; Sze wu hsien, *F. N. Meyer*, no. 1723, September 1, 1914; Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2376, July 4, 1922; Hua shan, alt. 500–1000 m., *J. Hers*, no. 3039, October 31, 1924; Tsing ling shan, 60 kilom. south of Sian fu, alt. 1000–1500 m., *J. Hers*, nos. 2934 and 2981, October 20, 1924.—See also Loesener, l. c. (1900 and 1902), Loesener & Rehder, l. c., Meyer, l. c., and Chung, l. c.

KANSU: several localities (ex Maximowicz, l. c.).

DISTRIBUTION: also Kiangsu, Chekiang, Hupeh, Manchuria, Korea and Japan.

The ciliate serration upon which Franchet & Savatier based their var. *ciliato-dentata* is most strikingly developed in Cowdry's no. 566 from Shantung, but also some other specimens as Meyer's no. 1354 and Purdom's nos. 4 and 1013 from Chili, Meyer's no. 1884 from Shansi, Hers' nos. 1036 and 2281 from Kiangsu and his no. 2376 from Shensi have a more or less similar setose serration.

The form which lacks the broad corky wings so characteristic for typical *E. alata* has been distinguished as var. *aptera* Reg.[1] To this form belong the following of the specimens cited above: North Kiangsu; Hers, nos. 1036 and 2281—Honan; Hers, nos. 2650 and 2803—Shansi; Meyer, no. 1884—Shensi: Giraldi's specimens from Lao y san and Thui kio tsuen; Purdom, nos. 9, 14, 342 and 375; Hers, no. 2981.—Kansu, Hers, no. 2421.—There are all gradations from branches with wings up to 12 mm. wide to those with very narrow wings or only tubercles and to branches entirely devoid of any trace of corky substance; sometimes the wings are present only on vigorous vegetative shoots, while flowering branches are without wings.

Evonymus alata var. **pubescens** Maximowicz in Mél. Biol XI. 197 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 454 (1882).

Evonymus alata var. *pilosa* Loesener & Rehder in Sargent, Pl. Wilson. I. 494 (1913).

CHILI: Weichang, *W. Purdom*, no. 30, in 1909; Hsiao Wu tai shan, *F. N. Meyer*, no. 1354, August 27, 1913 (in part), *J. Hers*, nos. 1471 and 1489, July 14, 1921; Po hua shan *J. Hers*, no. 1453, July 1, 1921;

[1] **Evonymus alata** var. **aptera** Regel, Tent. Fl. Ussur. 41 (1861) "apterus."
Evonymus subtriflora Blume, Bijdr. Fl. Ned. Ind. 1147 (1825).
Evonymus alata var. *subtriflora* Franchet & Savatier, Enum. Pl. Jap. II. 312 (1879).

Tung ling Mts., *N. H. Cowdry*, no. 1332, May 18, 1921.—See also Maximowicz, l. c., and Loesener & Rehder, l. c.

DISTRIBUTION: also Manchuria and Korea.

This variety seems to reach its western limit in Chili; the specimens cited above under *E. alata* from Shantung also show a slight trace of pubescence on the veins beneath, but hardly marked enough to be referred to this variety. Most of the specimens cited, except Hers' no. 1489 and Cowdry's no. 1332, have winged branches.

Evonymus alata var. **aperta** Loesener in Sargent, Pl. Wilson. I. 494 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII .110 (1922); Liste Ess. Lign. Honan Sept. 12 (1922).

SHANSI: Fang shan hsien, Nan yang shan, alt. 1500–2500 m., *J. Hers*, no. 2698, September 22, 1923.

KANSU: Yan pu ko, *F. N. Meyer*, no. 1783, October 6, 1914; near Liang tang, *F. N. Meyer*, no. 1948, September 24, 1914.

DISTRIBUTION: also Szechuan.

As this variety can only be recognized with certainty if ripe fruits are available, it is possible that some of the specimens without mature fruit cited under the type, belong here and I suspect that the variety replaces the type in Kansu and probably also occurs in Shensi. The variety does not occur in Feng tien, as stated by Chung (l. c.); the specimen on which he based the reference belongs to var. *pubescens* Maxim.

Evonymus verrucosoides Loesener in Bot. Jahrb. XXX. 462 (1902); XXXVI. beibl. LXXXII. 72 (1902).

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, nos. 899, 924, 939, 878, and 893, October 10, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1146, September 21, 1919.

SHENSI: several localities, *G. Giraldi* (ex Loesener, l. c.).

KANSU: Hung si hsien, alt. 1400 m., *J. Hers*, no. 2421, August 21, 1922.

DISTRIBUTION: also Hupeh and Szechuan.

As the description of this species is based on flowering specimens and the specimens from Szechuan and Hupeh identified by its author which are before me are likewise in flower, I relied in the identification of the specimens cited above which are in fruit chiefly on the long filaments partly persisting in the fruit which is lobed to the base as in *E. alata*. The branches of the Hers' specimens like those of the Szechuan and Hupeh are not verrucose. The leaves of the Honan specimens are rather large, up to 8 cm. long, acuminate, and closely serrulate with the tip of the teeth strongly incurved; the carpels, of which usually 1–3 develop, are elongated, about 1 cm. long and narrowed toward the apex and often distinctly rostrate; the arillus is as long as the ellipsoid seeds but with an opening near the apex. The winterbuds are remarkably

large, the terminal one being about 6 mm. long. The specimens from Kansu may belong to var. *viridiflora* Loes. & Rehd.; the young fruits are greenish and the leaves and fruits smaller.

Evonymus phellomana Loesener in Bot. Jahrb. XXIX. 444, t. 5, fig. D, E (1900); XXX. 463 (1902); XXXVI. beibl. LXXXII. 72 (1905).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

? *Evonymus europaea* β *Hamiltoniana* Maximowicz in Act. Hort. Petrop. XI. 97 (1889), quoad plantam ad fl. Lumbu collectam.

SHENSI: "Mt. Kian-san," *G. Giraldi*, August 4, 1897; Tai pei shan, *W. Purdom*, nos. 2, 10, 1012, 1043, in 1910.—See also Loesener, l. c., and Chung, l. c.

KANSU: Kar ching k'ou, near Old Tao chow, alt. 3100-3400 m., *R. C. Ching*, no. 833, August 26–31, 1923.—See also Maximowicz, l. c.

DISTRIBUTION: endemic.

Potanin's specimen from Lumbu river described by Maximowicz as with "ramis vetustioribus late suberoso-alatis" probably belongs here.

Evonymus nanoides Loesener & Rehder in Sargent, Pl. Wilson. I. 492 (1913).

KANSU: Kar ching k'ou, near Old Tao chow, alt. 3100–3400 m., *R. C. Ching*, no. 847, August 26–31, 1923; upper Kar Ching k'ou, alt. 3800–4300 m., *R. C. Ching*, no. 935, August 28–31, 1923; between Choni and Lanchow, alt. 2600–3000 m., *R. C. Ching*, no. 1039, September, 19–21, 1923.

DISTRIBUTION: also Szechuan.

The Kansu specimens agree well with the type except that the arillus is only about half as long as the seed as well in the immature as in the mature specimen.

I am inclined to refer to this species a specimen collected on the Wu tai shan, Chili, by F. N. Meyer, (no. 1353, August 27, 1913[1]), but it differs from the type in its broader leaves varying from linear-oblong to ovate-oblong or occasionally even elliptic or elliptic-obovate and in the arillus enclosing the seed except a very small opening at the apex, otherwise as in habit, in the quadrangular narrowly winged branches, the rather small thickish leaves and the very short-stalked fruit with only one or two valves fertile it agrees with the type.

Evonymus Przewalskii Maximowixz in Mél. Biol. XI. 194 (1881); in Bull. Acad. Sci. St. Pétersb. XXIX. 451 (1882); in Fl. Tangut. 108 (1889); in Act. Hort. Petrop. XI. 97 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 121 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 974 (1898).—Loesener in Bot. Jahrb. XXX. 464 (1902).—Rehder in Sargent, Pl. Wilson. I. 492 (1913).—Chung in Mem. Sci. Soc. China, 144 (Cat. Trees Shrubs China) (1924).

[1] See also U. S. Dept. Agric. Bur. Pl. Indust. Inv. Seeds Pl. Imp. XXXVII. 32, no. 36569 (1916).

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2013, September 7, 1922.

KANSU: Min chow district, alt. 2800 m., *W. Purdom*, no. 1050, in 1910; near Ping fan, alt. 2350–2800 m., *R. C. Ching*, no. 574, July 12–20, 1923; vicinity of Choni, alt. 3100–3300 m., *R. C. Ching*, no. 962, September 715, 1923.—See also Maximowicz, l. c., Hemsley, l. c., Bretschneider, l. c., Loesener, l. c., Rehder, l. c., and Chung, l. c.

DISTRIBUTION: endemic.

Envonymus pauciflora Maxim var. **chinensis**, comb. nov.

Evonymus verrucosa var. *chinensis* Maximowicz in Act. Hort. Petrop. XI. 96 (1889).—Loesener in Bot. Jahrb. XXX. 462 (1902); XXXVI. beibl. LXXXII. 72 (1905).—Chung in Mem. Sci. Soc. China, I. 145 (Cat. Trees Shrubs China) (1924).

SHENSI: "Tu-see-tsuen," *G. Giraldi*, September 15, 1897; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2355, July 3, 1922; without locality, *W. Purdom*, no. 5.—See also Loesener, l. c., and Chung, l. c.

KANSU: between Mör ping and Wu ping, *G. N. Potanin* (ex Maximowicz, l. c.).

DISTRIBUTION: endemic.

Though Maxmowicz reduced his *E. pauciflora* later to a variety of *E. verrucosa* Scop., and Loesener follows him, I prefer to consider it a distinct species. It differs from *E. verrucosa* chiefly in the pubescent generally larger, more finely serrulate and more distinctly acuminate leaves, shorter petioles, in the peduncles appearing in the axils of the middle or even the upper pairs of leaves, not the lowest or lower pairs, and in the central flower of the cyme being almost always lacking or if present borne on a pedicel much shorter than the lateral pedicels. Var. *chinensis* agrees with typical *E. pauciflora* in these characters, but differs chiefly in its usually 4–6-flowered inflorescence and stouter peduncles.

Evonymus verrucosa Scop. var. **tchefouensis** Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 133 (Fl. Tché-Foû 38) (1876).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 206 (Cat. Pl. Tché-fou) (1884).—Loesener in Bot. Jahrb. XXX. 462 (1902).

SHANTUNG: Chifu (ex Debeaux, l. c.).—See also Franchet, l. c., and Loesener, l. c.

This is a very doubtful plant and is certainly not closely related to *E. verrucosa*; judging from the description it may very well belong to *E. patens* Rehd. or *E. kiautschovica* Loes.

Evonymus lanceifolia Loesener in Bot. Jahrb. XXX. 462 (1902).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 13, (1922).—Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

HONAN: Hwei hsien, Shansi border, *J. Hers*, no. 722, June 19, 1919; Siao hsien, Huang tsang yu, alt. 200 m., *J. Hers*, no. 1004bis, May 26,

1919 (sterile); Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1716 and 1884, September 20 and 21, 1921.—See also Hers, l. c., and Chung, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1868, October 2, 1921.

SHENSI: near Pai hsi pu, *F. N. Meyer*, no. 1935, September 18, 1914.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Evonymus Maackii Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 358 (1857).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 151 (1919).—Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

Evonymus Hamiltoniana Loesener in Bot. Jahrb. XXXVI. beibl. LXXXII. 72 (1905).

CHILI: Siao Wu tai shan, *J. Hers*, no. 1576, July 16, 1921 (sterile; doubtful).

SHANTUNG: Kiauchow district (ex Loesener, l. c. [1919]).—See also Chung, l. c.

? SHENSI: Tue lian pin, *G. Giraldi* (ex Loesener, l. c. [1905]).

DISTRIBUTION: also Manchuria, Korea.

Of this species I have seen no specimen from northern China except the sterile specimen from Chili cited above of which I am not sure if it belongs here. I doubt if the species occurs in Shensi and Giraldi's specimen cited by Loesener may belong either to *E. lanceifolia* Loes. or *E. yedoensis* var. *Koehneana* Loes.

Evonymus yedoensis Koehne var. **Koehneana** Loesener in Sargent, Pl. Wilson. I. 491 (1913).—Chung in Mem. Sci. Soc. China, I. 145 (Cat. Trees Shrubs China) (1924.)

SHENSI: Tai pei shan, *W. Purdom*, no. 8, in 1910; Tsing ling, 60 kilom. south of Sianfu, alt. 1000–1500 m., *J. Hers*, no. 3014, October 20, 1924.—See also Loesener, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh and Szechuan.

Evonymus Bungeana Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859); in Mél. Biol. XI. 188 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 448 (1882); Fl. Tangut. 109 (1889).—Hance in Jour. Linn. Soc. XIII. 77 (1873).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 221 (Pl. David. I. 69) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 206 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 118 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 174, 330 (1898).—Loesener in Bot. Jahrb. XXX. 461 (1902); XXXVI. beibl. LXXXII. 72 (1905); in Bot. Centralbl. Beih. XXXVII pt. II. 151 (1919).—Bailey, Gent. Herb. I. 35 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 13 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 161 (Pl. Peitaiho) (1922).—Chung in Mem. Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924).

Evonymus micrantha Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 88 (Enum. Pl. Chin. Bor. 14) (1833). —Non Don.

CHILI: Peking, Pagoda Hill, near Summer Palace, *C. S. Sargent*, September 17, 1903, Peking, city wall, *F. N. Meyer*, no. 930, May 21, 1913; Peking, Temple of Heaven, *N. H. Cowdry*, no. 185, June 13, 1920 and *Dorsett & Dorsett*, no. 1134, November 1, 1924; west of Wei chang, *W. Purdom*, no. 99, 1909; Siao Wu tai shan, *J. Hers*, nos. 1528 and 1573, July 14 and 16, 1921; Kalgan, on mountain near temple, *N. H. Cowdry*, no. 1992, August, 1921; without precise locality, *F. N. Meyer*, nos. 205 and 224, October, 1905 (Herb. U. S. Dept. Agric.), *Pere Chanet*, no. 84, in 1919. —See also Maximowicz, l. c. (1859, 1881 and 1882), Hance, l. c., Franchet, l. c. (1883), Hemsley, l. c., Bretschneider, l. c., Loesener, l. c. (1902), Cowdry, l. c., Chung, l. c., and Bunge, l. c.

SHANTUNG: Chifu, English Churchyard, *C. S. Sargent*, September 22, 1903.—See also Franchet, l. c. (1884), Hemsley, l. c., Bretschneider, l. c. 174, Loesener, l. c., (1902 and 1919) and Chung, l. c.

NORTHERN KIANGSU: Suchow fu, Huang tsang yu, alt. 200 m., *J. Hers*, nos. 1067 and 2462, November 1, 1919 and October 3, 1922.

HONAN: Cheng chow, common in the plain, *J. Hers*, no. 13, May 9, 1919.- See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHANSI: Tun lan shui valley, alt. 1000 m., *J. Hers*, no. 2696, September 19, 1923 (tree more than 2 m. in girth).

SHENSI: foot of Hua shan, *J. Hers*, no. 3030, October 30, 1924. - See also Loesener, l. c. (1902 and 1905).

KANSU: Anting hsien, Tsang kow chen, alt. 2100 m., *J. Hers*, no. 2425, August 26, 1922.- See also Maximowicz, l. c. (1889).

DISTRIBUTION: also Chekiang; Manchuria and Korea.

The specimens from Shensi and Kansu cited above consist of sterile shoots and represent rather extreme forms; the Shensi specimen has rather narrow finely serrulate elliptic-ovate to oblong-lanceolate leaves, the narrower ones only about 2.5 cm. wide and about 8 cm. long, while the Kansu specimen has broadly ovate leaves remarkably deeply and sharply serrate, the teeth about 1 mm. long and toward the base of the leaf becoming elongated and up to 3 mm. long. A similar serration but not as pronounced can be seen in some large leaves accompanying Cowdry's fruiting specimen under no. 185 from near Peking.

Evonymus fimbriata Wallich apud Roxburgh, Fl. Ind. ed. Corey, II. 408 (1824).—Loesener in Bot. Jahrb. XXXVI. beibl. LXXXII. 72 (1905).—Chung in Mem Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924).

SHENSI: Hua tzo pin, *G. Giraldi*, no. 130 (ex Loesener, l. c.).—See also Chung, l. c.

DISTRIBUTION: also Himalayas.

Evonymus Giraldii Loesener in Bot. Jahrb. XXIX. 442, t. 5, c (1900). - Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess.

Lign. Honan Sept. 13 (1922).—Chung in Mem. Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924).

Evonymus Giraldii var. α. *genuina* Loesener, l. c. 433 (1900); xxx. 465 (1902).

HONAN: Lao kiun shan, alt. 900 m., *J. Hers*, no. 1235, September 23, 1919.—See also Hers, l. c., and Chung, l. c.

SHENSI: Tai pei shan, *G. Giraldi*, nos. 216 and 1478 (ex Loesener, l. c.).—See also Chung, l. c.

DISTRIBUTION: endemic.

Evonymus Giraldii var. **ciliata** Loesener in Bot. Jahrb. XXIX. 443 (1900); XXX. 465 (1902); XXXVI. beibl. LXXXII. 72 (1905).—Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

SHENSI: Kuan tou shan, *G. Giraldi*, no. 217 (ex Loesener, l. c. [1902 and 1905]).—See also Chung, l. c.

DISTRIBUTION: also Hupeh.

Evonymus Giraldii var. **angustialata** Loesener in Bot. Jahrb. XXXVI. beibl. LXXXII. 72 (1905).—Loesener & Rehder in Sargent, Pl. Wilson. I. 495 (1913).—Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

Evonymus fimbriata Loesener in Bot. Jahrb. XXX. 465 (1902).—Non Wallich.

SHENSI: Tai pei shan, *G. Giraldi*, September 1899, *W. Purdom*, no. 1, in 1910.—See also Loesener, l. c., Loesener & Rehder, l. c., and Chung, l. c.

KANSU: south of Minchow, alt. 2500–2700 m., *W. Purdom*, nos. 1061 and 1075, in 1910; Hsia mo k'ou, near Lichen, alt. 2000-3000 m., *R. C. Ching*, no. 380, July 7, 8, 1923; Gargannar, south of Old Tao chow, alt. 3600–4200 m., *R. C. Ching*, no. 886, August 28–31, 1923.

DISTRIBUTION: also Hupeh and Szechuan.

Evonymus sanguinea Loesener in Bot. Jahrb. XXIX. 441, t. 5, fig. A, B (1900).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

Evonymus sanguinea var. α. *orthoneura* Loesener in Bot. Jahrb. XXIX. 442 (1900).

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 203, April 23, 1919; Hwei hsien, Shansi border, *J. Hers*, no. 759, June 19, 1919; Lu shih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1145, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1804 and 1883, September 21, 1921.—See also Chung, l. c.

SHANSI: Chin yuan, alt. 1700 m., *K. Ling*, July 12, 1925, Herb. Univ. Nanking nos. 9286, 9287.

SHENSI: "Mte. Kin-qua-san," *G. Giraldi*, July 10, 1897; "Ta sce tsuen," *G. Giraldi*, Sept. 18, 1897; "Mte. Qua in san," *G. Giraldi*, July 16–20, 1897; Lao y san, *G. Giraldi*, 1897.—See also Chung, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Evonymus sanguinea var. **camptoneura** Loesener in Bot. Jahrb. XXIX. 442 (1900); XXX. 465 (1902); XXXVI. beibl. LXXXII. 72 (1905).

KANSU: Lotani, south of Minchow, alt. 2450, m., *W. Purdom*, no. 1060, in 1910.

DISTRIBUTION: also Hupeh and Szechuan.

Evonymus sanguinea var. **laxa** Loesener in Bot. Jahrb. XXX. 465 (1902); XXXVI. beibl. LXXXII. 72 (1905).

SHENSI: Tai pei shan, *W. Purdom*, no. 13, in 1910.—See also Loesener, l. c.

DISTRIBUTION: endemic.

Evonymus sanguinea var. **brevipedunculata** Loesener, in Sargent, Pl. Wilson. I. 495 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 13 (1922).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 936, October 10, 1919.—See also Hers, l. c., and Chung, l. c.

DISTRIBUTION: also Szechuan.

Evonymus porphyrea Loesener in Not. Bot. Gard. Edinb. VIII. 2 (1913).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

SHENSI: Tai pei shan, *W. Purdom*, no. 11, in 1910.—See also Chung, l. c.

DISTRIBUTION: also Szechuan, Yunnan.

Chung (l. c.) also cites Kansu, but I have neither seen a specimen from that province nor found a reference in literature except Chung's. I am somewhat in doubt whether Purdom's specimen belongs here, as the petals have dropped and the ovary is only slightly purplish.

Evonymus shensiana Maximowicz in Mél. Biol. XI. 183 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 444 (1882); in Act. Hort. Petrop. XI. 96 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 121 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 996 (1898).—Loesener in Bot. Jahrb. XXIX. 443 (1900); XXX. 464 (1902).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

Evonymus elegantissima Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 13 (1912).—Chung in Mem. Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924), quoad prov. Chili cit.—Non Loesener & Rehder.

CHILI: without precise locality, *Père Chanet*, no. 21, in 1918.—See also Chung, l. c.

HONAN: Chengchow, cultivated, *J. Hers*, no. 38, April 20, 1920.—See also Hers, l. c.

SHENSI: at foot of Hua shan, *J. Hers*, nos. 3029 and 3031, October 30, 1924.—See also Maximowicz, l. c., Hemsley, l. c., Bretschneider, l. c., Loesener, l. c., and Chung, l. c.

DISTRIBUTION: endemic.

The Shensi specimens are in mature fruit which measures 4 4.5 cm. across and has broad-oblong obtuse wings, 1.2 1.5 cm. long; the nut-

brown lustrous seeds 1 or 2 in each locule are short-ellipsoid, 6 mm. long and entirely enclosed by the orange arillus; the larger leaves are elliptic-lanceolate, 5–8 cm. long and 1.8–2.7 cm. wide. *Evonymus elegantissima* Loes. & Rehd. is somewhat similar, but it has much longer peduncles and narrower and longer leaves.

Evonymus sacchalinensis Maximowicz in Mél. Biol. XI. 185 (1881); in Bull. Acad. Sci. St. Pétersb. XXIX. 446 (1882); Fl. Tangut. 110 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 121 (1886).—Loesener in Bot. Jahrb. XXX. 464 (1902).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

KANSU: alpine region along the Tatung river, *N. Przewalski* (ex Maximowicz, l. c.).—See also Hemsley, l. c., Loesener, l. c., and Chung, l. c.

DISTRIBUTION: also Manchuria, Saghalin, Korea and Japan.

Evonymus macroptera Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 359 (1857.)—Maximowicz in Act. Hort. Petrop. XI. 97 (1889); Fl. Tangut. 110 (1889).—Loesener in Bot. Jahrb. XXX. 465 (1902).

KANSU: between Mörping and Wuping, *G. N. Potanin* (ex Maximowicz. l. c.).—See also Loesener, l. c.

DISTRIBUTION: also Manchuria, Saghalin, Korea, Japan.

Evonymus oxyphylla Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 86 (1866).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1919).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

? SHANTUNG: Cape Ya tau, *Krug*, no. 281 (ex Loesener, l. c.).—See also Chung, l. c.

DISTRIBUTION: also Korea, Japan.

Loesener (l. c.) says that the determination of King's specimen is not quite final as he did not see fruits.

Evonymus cornuta Hemsley in Kew Bull. Misc. Inform. 1893, 209.—Loesener in Bot. Jahrb. XXXVI. beibl. LXXXII. 72 (1905).—Loesener & Rehder in Sargent, Pl. Wilson. I. (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 12 (1922).—Chung in Mem. Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924).

HONAN: Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1163, September 21, 1919.—See also Hers, l. c.

SHENSI: Tai pei shan, *W. Purdom*, no. 6, in 1910; Tai pei shan, west valley, *W. Purdom*, no. 432, in 1910.—See also Loesener, l. c., Loesener & Rehder, l. c., and Chung, l. c.

KANSU: Chi shan; near Cheng hsien, *F. N. Meyer*, no. 1781, October 1, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: also Hupeh, Szechuan.

Evonymus venosa Hemsley, in Kew Bull. Misc. Inform. 1893, 210.—Loesener in Bot. Jahrb. XXIX. 441 (1900); XXX. 458 (1902); XXXVI. beibl. LXXXII. 72 (1905).—Loesener & Rehder in Sargent, Pl. Wilson. I. 488 (1913).—Chung in Mem. Sci. Soc. China, I. 142 (Cat. Trees Shrubs China) (1924).

SHENSI: "Kin san (Huo kia zaez)," *G. Giraldi*, July 23, 1897.—See also Loesener, l. c., Loesener & Rehder, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh.

Evonymus microcarpa Sprague in Kew Bull. Misc. Inform. (1908).—Loesener & Rehder in Sargent, Pl. Wilson. I. 487 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 13 (1922).—Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

Evonymus chinensis Lindl. var. *microcarpa* Oliver apud Loesener, in Bot. Jahrb. XXX. 456 (1902); XXXVI. beibl. LXXXII. 71 (1905).

HONAN: Lushih, Tang ho, alt. 100 m., *J. Hers*, no. 954, October 11, 1919.—See also Hers, l. c.

SHENSI: "Mte. Huan tou san" *G. Giraldi*, July, 1899; temple garden at foot of Tai pei shan, *W. Purdom*, no. 12, in 1910.—See also Loesener & Rehder, l. c., Chung, l. c., and Loesener, l. c. (1905).

DISTRIBUTION: also Hupeh and Szechuan.

Evonymus kiautschovica Loesener in Bot. Jahrb. XXX. 453 (1902); XXXIV. beibl. LXXV. 49 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 151 (1919).—Chung in Mem. Sci. Soc. China, I. 143 (Cat. Trees Shrubs China) (1924).

SHANTUNG: near Tsing tau (ex Loesener, l. c.).—See also Chung, l. c.

DISTRIBUTION: endemic.

Evonymus patens Rehder in Sargent, Trees & Shrubs, I. 127, t. 64 (1903).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

Evonymus kiautschovica var. *patens* Loesener in Sargent, Pl. Wilson. I. 486 (1913).

SHANTUNG: Chifu, growing over walls, *N. H. Coudry*, no. 561, July, 1920.

NORTHERN KIANGSU: Silientao Island near Haichow, *J. Hers*, no. 613, May 7, 1921.

HONAN: Lushih, Shan tao ho, alt. 600 m., *J. Hers*, no. 851, October 8, 1919.

DISTRIBUTION: also Kiangsu, Anhwei, Hupeh, Chekiang, Kwangtung.

Loesener refers this species as a variety to *E. kiautschovica* of which I have seen no specimens; according to the description *E. kiautschovica* differs chiefly in its smaller obovate-oblong leaves with the lateral veins obsolete above.

Evonymus radicans Sieb. var. **acuta** Rehder in Mitt. Deutsch. Dendr. Ges. XXII. 257 (1913).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl.

Indust. Inv. Seeds Pl. Imp. XXXVIII. 71, 72, nos. 37541 and 37546 (1917).—Chung in Mem. Sci. Soc. China, I. 144 (Cat. Trees Shrubs China) (1924).

Evonymus japonica Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 206 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 120 (1886).—Loesener in Bot. Jahrb. XXX. 453 (1902); XXXVI. beibl. LXXXII. 71 (1905)—Non Thunberg.

Evonymus japonica var. *radicans* Loesener in Sargent, Pl. Wilson. I. 485 (1913); in Bot. Centralbl. Beih. XXXVII. pt. II. 151 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan Sept. 13 (1922).—Vix Miquel.

Evonymus japonica var. *acuta* Rehder in Sargent, Pl. Wilson. I. 485 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922), sphalmate "acuminata"; Liste Ess. Lign. Honan Sept. 13 (1922).

SHANTUNG: Chifu gardens, *N. H. Cowdry*, no. 589, July 1, 1920 (sterile, doubtful).—See also Franchet, l. c., Hemsley, l. c., Loesener, l. c. (1902, 1919).

HONAN: Yungning, Tsi li ping, *J. Hers*, no. 435, May 22, 1919.—See also Hers, l. c., and Chung, l. c.

SHANSI: Tai yuan fu, *F. N. Meyer*, no. 383, May, 1907.

SHENSI: Huo kio zaez, *G. Giraldi*, August 3, 1897; Ya tze ko, *F. N. Meyer*, no. 1694, January 22, 1914; foot of Hua shan, *J. Hers*, no. 3034, October 30, 1924.—See also Loesener, l. c. (1905), Meyer, l. c., and Chung, l. c.

DISTRIBUTION: also Kiangsu, Hupeh, Szechuan, Yunnan.

There can be little doubt that the plant from Shantung referred by Franchet and by Hemsley to *E. japonica* and that from Shensi referred by Loesener to the same species belongs to *E. radicans* var. *acuta* of which I have seen specimens from both these provinces, while of the true *E. japonica* I have not yet seen a specimen from China. From seeds of Meyer's no. 1694 collected at Ya tze ko plants were raised whose leaves assumed in autumn a deep purple color, differing in this respect from plants raised from seed sent by E. H. Wilson from Hupeh which retained their green color during the winter; this form has been distinguished as *f. colorata* Rehd. (in Jour. Arnold Arb. VII. 30 [1926]).

Evonymus grandiflora Wallich in Roxburgh, Fl. Ind. ed. Carey, II. 404 (1824).—Loesener in Bot. Jahrb. XXX. 452 (1902); XXXVI. beibl. LXXXII. 71 (1905).—Bailey, Gent. Herb. I. 35 (1920).

HONAN: Chikung shan (ex Bailey, l. c.).

SHENSI: Lun san huo and Hua kia wa, *G. Giraldi* (ex Loesener, l. c.).

DISTRIBUTION: also Hupeh, Kiangsi, Szechuan, Yunnan; Himalayas, Khasia.

Celastrus angulata Maximowixz in Mél. Biol. XI. 199 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 455 (1882); in Act. Hort. Petrop. XI. 98 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 122 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 996 (1898).—Loesener in Bot. Jahrb. XXIX. 446 (1900); XXX. 470 (1902).—Meyer in U. S. Dept. Agric. Bur.

Pl. Indust. Inv. Seeds Pl. Imp. XL. 34, no. 38836 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan Sept. 6 (1922).—Chung in Mem. Sci. Soc. China, I. 145 (Cat. Trees Shrubs China) (1924).

Celastrus latifolius Hemsley in Jour. Linn. Soc. XXIII. 123 (1886).—Maximowicz in Act. Hort. Petrop. XI. 98 (1889).

HONAN: Teng feng hsien, Yu tai shan, alt. 600 m., *J. Hers*, no. 269, June 17, 1919; Yingning Tsi li ping, *J. Hers*, no. 417, May 22, 1919; Hwei hsien, Ta fu sze, *J. Hers*, no. 772, June 16, 1919; Lu shih, Hiung eul shan, alt. 1300 m., *J. Hers*, no. 861, October 9, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1288, September 25, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1314, September 27, 1919; Tsi yuan hsien, alt. 500 m. *J. Hers*, no. 2670, August 23, 1923; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1712, September 20, 1921.—See also Hers, l. c., and Chung, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1831, October 2, 1921.

SHENSI: Tai pei shan, *W. Purdom*, nos. 946 and 946a, in 1910; Ta hua shan, *F. N. Meyer*, no. 1843, December 30, 1913 (Herb. U. S. Dept. Agric.); Sze wu hsien, *F. N. Meyer*, no. 1722, September 21, 1914 (Herb. U. S. Dept. Agric.); Shih tan, alt. 850 m., *J. Hers*, no. 2442, October 10, 1922; Tsin ling shan, 60 kilom. south of Sian fu, alt. 1000–1500 m., *J. Hers*, nos. 2932 and 3010, October 20, 1924; Hua shan, alt. 1000–1500 m., *J. Hers*, no. 3097, October 31, 1924.—See also Loesener, l. c., Meyer, l. c., and Chung, l. c.

KANSU: Hoang ho valley (ex Maximowicz, l. c.).—See also Hemsley, l. c., Bretschneider, l. c., Loesener, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh, Hunan, Kweichou, Szechuan, Yunnan.

Celastrus hypoleuca Warburg apud Loesener in Bot. Jahrb. XXIX. 445 (1900); XXXVI. beibl. LXXXII. 72 (1905). Rehder & Wilson in Sargent, Pl. Wilson. II. 346 (1915). Hers in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan Sept. 6 (1922). Chung in Mem. Sci. Soc. China, I. 146 (Cat. Trees Shrubs China) (1924).

Celastrus hypoleucus f. *β. argutior* Loesener in Bot. Jahrb. XXIX. 445 (1900); XXX. 467 (1902).

HONAN: Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1168, September 21, 1919.—See also Hers, l. c.

SHENSI: "Mte. Kinqua-san, M. Thae-pei-san, Qua-in-san," *G. Giraldi*, July 10, 15 20 and 16, 1897.—See also Loesener, l. c., Rehder & Wilson, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh, Kweichou, Szechuan.

Celastrus articulata Thumberg, Fl. Jap. (1784).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 88 (Enum. Pl. Chin. Bor. 14) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859); in Mél. Biol. XI. 200 (1881); in Bull. Acad. Sci. St.

Pétersb. XXVII. 456 (1882).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 222 (Pl. David. I. 70) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 206 (Cat. Pl. Tché-fou) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 122 (1886), pro parte.—Loesener in Bot. Jahrb. XXIX. 446 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. II. 356 (1915).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 161 (1922).—Chung in Mem. Sci. Soc. China, I. 145 (Cat. Trees Shrubs China) (1924).

Celastrus orbiculatus Thunberg, Fl. Jap. p. XLII (1784), nomen nudum.—Loesener in Bot. Jahrb. XXX. 468 (1902); XXXIV. beibl. LXXV. 49 (1904); in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1919).

Celastrus Tatarinowii Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 357 (1857).— Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 470 (Ind. Fl. Pekin.) (1859).

Celastrus n. sp. Maximowicz, l. c.

Celastrus orbiculata f. γ. *major* Loesener in Bot. Jahrb. XXX. 469 (1902); XXXVI. beibl. LXXXII. 72 (1905).

Celastrus Loeseneri Hers. in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan Sept. 7 (1922).—Non Rehder & Wilson.

CHILI: Peking-Kalgan road, hills near Great Wall, *J. G. Jack*, October 5, 1905; Peking, western hills, *J. Hers*, nos. 1579 and 1589, August 7, 1921; Ch'a tao, *J. Hers*, no. 1543, July 23, 1921; Siao Wu tai shan, *J. Hers*, no. 1544 and 1547, July 14, 1921; Men tow kow, alt. 500 m., *J. Hers*, no. 2553, July 8, 1923; Tung ling Mts., *N. H. Cowdry*, no. 1331; May 18, 1921.—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., Bretschneider, l. c., Rehder & Wilson, l. c., Cowdry, l. c., Chung, l. c., and Loesener, l. c. (1902).

SHANTUNG: Bo shan, *F. N. Meyer*, no. 368, September, 1907 (Herb. U. S. Dept. Agric.).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 619, May 5, 1921.

HONAN: Siashih, *J. Hers*, no. 345, May 25, 1921; Hwei hsien, Shansi border, *J. Hers*, no. 704, June 19, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 828, October 4, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1272, September 25, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1758, September 21, 1921; Tsi yuan hsien, Pei ting shan, alt. 1200 m., *J. Hers*, no. 2795, October 10, 1923; Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 2791, September 27, 1923; without precise locality, *J. Hers*, no. 26, 1918.—See also Hers, l. c.

SHANSI: Tchao yu, *F. N. Meyer*, no. 1881, July 22, 1914 (Herb. U. S. Dept. Agric.).

SHENSI: Lao y san, Zu lu, *G. Giraldi*, June 4, 1897; without precise locality, *W. Purdom*, no. 945, in 1910.

DISTRIBUTION: also Hupeh; Manchuria, Korea, Japan.

? **Celastrus stylosa** Wallich in Roxburgh, Fl. Ind. ed. Carey, II. 401 (1824).—Loesener in Bot. Jahrb. XXX. 469 (1902); XXXVI. beibl. LXXXII 72 (1905).

Celastrus latifolia Maximowicz in Act. Hort. Petrop. XI. 98 (1889), pro parte.—Non Hemsley.

SHENSI: Lao y shan, and Tsin ling shan, *G. Giraldi* (ex Loesener, l. c. [1905]).

KANSU: *G. N. Potanin* (ex Loesener, l. c. [1902]).—See also Maximowicz, l. c.

I have seen none of the specimens enumerated by Loesener, and no specimen of Celastrus from Kansu. The Kansu plant may possibly be identical with *C. Hookeri* Prain to which, partly, *C. stylosa* Lawson (not Wallich) belongs or it may be a form of *C. orbiculata* Thunb. and the Shensi plant may be *C. Loeseneri* Rehd. & Wils.

Celastrus Loeseneri Rehder & Wilson in Sargent, Pl. Wilson. II. 350 (1915).—Chung in Mem. Sci. Soc. China, I. 145 (Cat. Trees Shrubs China) (1924).

SHENSI: Tai pei shan, *W. Purdom*, no. 944, in 1910.—See also Chung, l. c.

KANSU: near Liang tang, *F. N. Meyer*, no. 1673, September 24, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: also Hupeh and Szechuan.

Some of the Shensi specimens enumerated by Loesener under *C. articulatus* and *C. orbiculatus* (in Bot. Jahrb. XXIX. 446 and XXX. 468) may belong to this species, but the only specimen collected by Giraldi which I have seen belongs to *C. orbiculata*.

Celastrus flagellaris Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 357 (1857).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 223 (Pl. David. I. 71) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 123 (1886).—Loesener in Bot. Jahrb. XXX. 470 (1902).—Chung in Mem. Sci. Soc. China, I. 145 (Cat. Trees Shrubs China) (1924).

CHILI: Jehol, *A. David* (ex Franchet, l. c.).—See also Hemsley, l. c., Loesener, l. c., and Chung, l. c.

SHANTUNG: Chifu, *O. Warburg* (ex Loesener, l. c.).

DISTRIBUTION: also Manchuria, Korea, Japan.

STAPHYLEACEAE

Staphylea bumalda De Candolle Prodr. II. 2 (1825).—Bailey, Gent. Herb. I. 35 (1920).

HONAN: Chi kung shan, *L. H. Bailey*, June 1917 (Gray Herb.).—See also Bailey, l. c.

DISTRIBUTION: Hupeh, Chekiang, Korea, Japan.

Staphylea holocarpa Hemsley in Kew Bull. Misc. Inform. 1895, 15.—Rehder & Wilson in Sargent, Pl. Wilson. II. (1914).—Hers in Jour. N. China Brand R. As. Soc. LIII. 116 (1922).—Chung in Mem. Sci. Soc. China, I. 147 (Cat. Trees Shrubs China) (1924).

Staphylea Emodi Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Non Wallich.

HONAN: Mienchih, alt. 800 m., *J. Hers*, no. 56, August 20, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, nos. 882, 909, 916, October

10, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1184, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1748, 1762, 1900, September 21, 1921.

SHENSI: Lao y san, *G. Giraldi*, June 4, 1897; Kin tou san, *G. Giraldi*, July 14, 1897; Qua in san, *G. Giraldi*, July 16, 1897; northwest of Han cheng hsien, *W. Purdom*, nos. 316, 316*** in 1910; northwest of Han cheng hsien, Moutan shan, alt. 1400 m., *W. Purdom*, no. 365 in 1910; Tai pei shan, *W. Purdom*, no. 446, in 1910; Kwang yin tang, *F. N. Meyer*, no. 1915, September 15, 1914 (Herb. U. S. Dept. Agric.); Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2345, July 3, 1922; Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2374, July 4, 1922.—See also Rehder & Wilson, l. c., Chung, l. c., and Diels, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

ACERACEAE

Dipteronia sinensis Oliver in Hooker's Icon. XXIX. t. 1898 (1889).—Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Chung in Mem. Sci. Soc. China, I. 73 (Cat. Trees Shrubs China) (1924).

HONAN: Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1342, September 30, 1919.

SHENSI: Kian san, *G. Giraldi*, August 4, 1897, *Hugh Scallan*, about 1899; Pao ki, *Hugh Scallan*, no. 89, about 1899; Ngo san and Kiong san, *Hugh Scallan*, about 1899.—See also Pax, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Acer truncatum Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 84 (Enum. Pl. Chin. Bor. 10) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XXVI. 444 (1880); in Mél. Biol. X. 601 (1880).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 228 (Pl. David. I. 76) (1883); in Mém. Soc. Sci. Nat. Cherbourg XXIV. 208 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 142 (1886).—Pax in Bot. Jahrb. VII. 234 (1886); XXXIV. beibl. LXXV. 49 (1904); in Engler Pflanzenr. IV.–163, 46 (1902).—Bretschneider, Hist. Eur. Bot. Discov. China, 331 (1898).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Rehder in Sargent, Trees & Shrubs, I. 151, t. 76 (1905).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1898).—Hers, Liste Ess. Lign. Honan Sept. 2 (1922).—Chung in Mem. Sci. Soc. China, I. 151 (Cat. Trees Shrubs China) (1924).

Acer laetum β. *truncatum* Regel in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 217 (1857); in Mél. Biol. II. 486 (1857).

CHILI: Peking, *S. W. Williams*, June, 1866, Herb. Hance, no. 10508 (Gray Herb.), *S. W. Williams*, August, 1876 (Gray Herb.), *O. Warburg*, no. 6769, in 1887, *N. H. Cowdry*, in 1919; Peking, Pagoda Hill, Summer Palace, *C. S. Sargent*, September 17, 1903; Peking, Cemetery, *J. G. Jack*,

October 10, 1905; western hills near Peking, *F. N. Meyer*, nos. 192, 215, October, 1905, *J. Hers*, nos. 1396, 2222, May 15, 1921 and October 11, 1922; Po hua shan, *J. Hers*, nos. 1411, 1418, May 1, 1921; Miao feng shan, alt. 1000 m., *J. Hers*, no. 2526, June 17, 1923; Tung ling, *N. H. Coudry*, no. 1311, May 18, 1921 (sterile); without precise locality, Père Chanet in 1918.—See also Bunge, l. c., Turczaninov, l. c., Maximowiez, l. c., Franchet, l. c. (1883), Hemsley, l. c., Pax, l. c. (1886, 1902), Bretschneider, l. c., Rehder, l. c., and Chung, l. c.

SHANTUNG: Tsing tau and Lau shan (ex Loesener, l. c.).—See also Franchet, l. c. (1884), Hemsley, l. c., Faber, l. c., Pax, l. c., and Rehder, l. c.

NORTHERN KIANGSU: Suchow fu, Huang tsang yu, alt. 200 m., *J. Hers*, nos. 1061, 2809, November, 1, 1919 and October 15, 1923; Siao hsien, Huang tsang yu, alt. 200 m., *J. Hers*, nos. 1016, 1016bis, April 25 and May 26, 1919.

HONAN: Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1731, September 21, 1921.—See also Hers, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1864, October 2, 1921.

DISTRIBUTION: endemic.

Acer truncatum is closely related to the following species and might be considered a variety of it. It differs chiefly in its constantly 5-lobed leaves, truncate at base with the basal lobes only little smaller than the other lateral lobes and only very rarely with an additional small lobe at the base, in the larger flowers and larger fruit with the broad flat nutlet about 1.5 cm. long and only little shorter than the broad wing. In Jack's specimen one branch shows typical fruits, while the other branch has fruit much like that of *A. pictum* with smaller nutlets and longer and narrower wing but the leaves of both branches are identical. From Shantung I have seen no specimens and those from Honan and Shansi are sterile and I therefore am not perfectly sure of their correct identification.

Acer pictum Thunb. var. **parviflorum** Schneider, Ill. Handb. Laubholzk. II. 225 (1907).—Bailey, Gent. Herb. I. 35 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).

Acer pictum var. *Mono* Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 229 (Pl. David. I. 77) (1883).—Rehder in Sargent, Trees & Shrubs, I. 177 (1905).

Acer Lobelii Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 229 (Pl. David. I. 77 (1883).—Hemsley in Jour. Linn. Soc. XXIII. 140 (1886).—Non Tenore.

Acer pictum Hemsley in Jour. Linn. Soc. XXIII. 141 (1886).—Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 74 (1905).—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).—Vix Thunberg.

Acer truncatum Maximowiez in Act. Hort. Petrop. XI. 109 (1889).—Non Bunge.

Acer pictum var. *α. typicum* subvar. 2. *mono* Pax in Engler Pflanzenr. IV.-163, 47 (1902); in Bot. Jahrb. XXXIV. beibl. LXXV. 49 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1919).

Acer lactum Rehder in Sargent, Trees & Shrubs, 1. 177 (1905), quoad plantam e Chili.—Non C. A. Meyer.

CHILI: Weichang, *W. Purdom*, nos. 45, 94, in 1910; Hsiao Wu tai shan, *F. N. Meyer*, no. 1314, August 23, 1913, *J. Hers*, no. 1487, July 14. 1921; Siao Wu tai shan, Tieh ling, sze alt. 1300 m., *J. Hers*, no. 2132, October 7, 1922; Siao Wu tai shan, alt. 1500 m., *J. Hers*, no. 2151, October 8, 1922; Po hua shan, *J. Hers*, nos. 1403, 1434, 2240bis, May 1 and July 1, 1921, and October 12, 1922; Huai lai hsien, Yang kia ping, alt. 900 m., *J. Hers*, no. 2098, October 4, 1922.—See also Franchet, l. c., Rehder, l. c., Hemsley, l. c., Pax, l. c., (1902), and Chung, l. c.

SHANTUNG: Tsingtau, *R. Zimmermann*, no. 351, in 1901; *F. N. Meyer*, no. 387, August, 1907.—See also Chung, l. c., Pax, l. c., (1904), and Loesener, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no 611, May 5, 1921; Hai chow hills, alt. 200m., *Kang Fu Lai*, Hers, no. 2295, October 8, 1922.

HONAN: Chi kung shan, *L. H. Bailey*, June 17, 1917; Teng feng, Yu tai shan, *J. Hers*, no. 301, June 17, 1919; Hwei hsien, Fu tien wang, *J. Hers*, no. 702, June 17, 1919; Hwei hsien, Ta fu sze, *J. Hers*, no. 769, June 16, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, nos. 876, 933, October 10, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 965, October 12, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1216, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1747, September 21, 1921; without precise locality, *J. Hers*, no. 4, in 1918.—See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHANSI: Wu tai shan, alt. 1600 m., *J. Hers*, no. 2640, July 31, 1923.

SHENSI: Tsing ling, 60 kilom. south of Sian fu, alt. 1000–1500 m., *J. Hers*, no. 2955, October 20, 1924; Hua shan, alt. 1000 m., *J. Hers*, nos. 3060, 3062, October 31, 1924.—See also Pax, l. c. (1905).

KANSU: Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1757, October 1, 1914.—See also Maximowicz, l. c.

DISTRIBUTION: also Hupeh, Szechuan; Manchuria, Korea, Japan.

All the Chinese specimens and also those from Manchuria and Korea belong to var. *parviflorum* described originally by Maximowicz as *A. mono*. This form is also common in Japan, while the form considered typical by Maximowicz and called var. *typicum* sub-var. *eupictum* by Pax seems less common. That the form with upright or ascending wings constitutes the type of the species is apparently only an assumption of Maximowicz, as Thunberg based his species on sterile specimens of a garden form with variegated leaves. Franchet's *Acer Lobelii* belongs without doubt to *A. pictum parviflorum* and not to the following species of which I have seen no specimens from Chili. There can be little doubt that Maximowicz's *A. truncatum* from Kansu belongs here rather than to typical *A. truncatum*.

Acer longipes Franchet apud Rehder in Sargent, Trees & Shrubs, 1. 178 (1905).

? *Acer cappadocicum* Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).—Chung in Mem. Sci. Soc. China 1. 148 (Cat. Trees Shrubs China) (1924).—Non Gleditsch.

HONAN: Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1339, September 30, 1919.

SHENSI: near Kwang yin tang, *F. N. Meyer*, no. 1918, September 15, 1914 (Herb. U. S. Dept. Agric.); Lung chow, Sien fo shan, alt. 1000 m., *J. Hers*, no. 2323, July 2, 1922; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2338, July 3, 1922.

DISTRIBUTION: also Anhwei and Hupeh.

The specimens cited above are all sterile and differ from the typical form in the presence of small basal lobes on nearly all the leaves and in the absence of undivided leaves, but in their other characters the Shensi specimens agree well with *A. longipes* except that in no. 2323 the lobes are long and narrow. The Honan specimen consists of very vigorous shoots, possibly sprouts from a stump, and has shorter petioles and the basal lobes of the leaves are directed downward so as to form a sagittate base, their texture is thicker and the pubescence on the under side is rather slight; in all these characters this Honan specimen resembles specimens from young seedling plants raised in this Arboretum from seeds of Wilson's no. 434 which is typical *A. longipes*, also the tendency toward a sagittate base is noticeable. I suspect that the enumeration of *A. cappadocicum* Gled. as a Honan plant by Hers (l. c.) and subsequently by Chung was based on this specimen which was named tentatively *A. cappadocicum* in the herbarium, no true *A. cappadocicum* var. *sinicum* being present in the Honan collection made by Hers of which there is a complete set in this herbarium.

Acer robustum Pax in Engler, Pflanzenr. IV. 162, 79 (1902); in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Rehder in Sargent, Trees & Shrubs, 1. 179 (1905).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 2 (1922).—Chung in Mem. Sci. Soc. China, 1. 150 (Cat. Trees Shrubs China) (1924).

Acer palmatum ? Bailey, Gent. Herb. 1. 35 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 908, October 10, 1919; Sung hsien, Shih Tze miao, alt. 1200 m., *J. Hers*, no. 1255, September 25, 1919.—See also Hers, l. c., and ? Bailey, l. c.

SHENSI: Huan ton san, *G. Giraldi*, no. 2116, July 24 26 (1895); Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2349, July 3, 1922.—See also Pax, l. c., Rehder, l. c., and Chung, l. c.

DISTRIBUTION: also Hupeh.

The specimens cited above are sterile; no. 2349 from Shensi has the lobes of the leaves lobulate and also in no. 908 from Honan they are more deeply and distinctly doubly serrate, while in the type the serration is partly simple and rather close.

Acer Oliverianum Pax in Hooker's Icon. XIX. sub tab. 1897 (1889).—Rehder in Sargent, Trees & Shrubs, I. 153, t. 77 (1905).

KANSU: Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1757, October 1, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION (excl. vars.): Hupeh, Anhwei, and Chekiang.

Meyer's specimen is sterile and differs from typical *A. Oliverianum* in the larger more deeply divided leaves with narrower and longer lobes; it is apparently a vigorous shoot from a young plant and agrees perfectly in its leaves with specimens from young cultivated plants. There is however, the possibility that the specimen represents a form with aberrant leaves of *A. sinense* Pax.

Acer Giraldii Pax in Engler, Pflanzenr. IV. -162, 79 (1902); in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Rehder in Sargent, Trees & Shrubs, I. 179 (1905); in Sargent, Pl. Wilson. I. 90 (1911).—Chung in Mem. Sci. Soc. China, I. 149 (Cat. Trees Shrubs China) (1924).

SHENSI: "Prima zona del falde de Thae-pei-san," *G. Giraldi*, no. 2115, August 10–20, 1894 (fruits and photograph of type).—See also Pax, l. c., Rehder, l. c., and Chung, l. c.

DISTRIBUTION: also Szechuan.

Acer erianthum Schwerin in Mitt. Deutsch. Dendr. Ges. x. 59 (1901).—Rehder in Sargent, Trees & Shrubs, I. 159, t. 80 (1905).—Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Chung in Mem. Sci. Soc. China, I. 148 (Cat. Trees & Shrubs China) (1924).

SHENSI: Kian san (Lao y san), *G. Giraldi*, August 4, 1897; Ki fong san, *Hugh Scallan*, in 1899.—See also Pax, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Acer caudatum Wall. var. **multiserratum** Rehder in Sargent, Trees & Shrubs, I. 163, t. 82, fig. 11 (1905).

Acer multiserratum Maximowicz in Act. Hort. Petrop. XI. 107 (1889).—Bretschneider in Hist. Eur. Bot. Discov. China, 1027 (1898).—Pax in Engler, Pflanzenr. IV.-162, 21 (1902).—Chung in Mem. Sci. Soc. China, I. 149 (Cat. Trees Shrubs China) (1924).

Acer spicatum var. *ukurunduense* Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Non Maximowicz.

Acer caudatum var. *ukurunduense* Chung in Mem. Sci. Soc. China, I. 148 (Cat. Trees Shrubs China) (1924), quoad plantam e Shensi et Hupeh.—Non Rehder.

SHENSI: Kian san (Lao y san) *G. Giraldi*, August 4, 1897; "Thae pei san, Ngo san, Huan tou san, Ki fong san and Miao wang san," *Hugh Scallan*, in 1899.—See also Pax, l. c., (1905) and Chung, l. c.

KANSU: between Mörping and Wuping, and Idshu shan, *G. N. Potanin* (ex Maximowicz, l. c.). —See also Bretschneider, l. c., Pax, l. c. (1902), Rehder, l. c., and Chung, l. c.

The specimens from Shensi resemble in the more pubescent under side of the leaves var. *ukurunduense* (Trautv. & Mey.) Rehd., but the branchlets are glabrous and the serration is like that of typical var. *multiserratum*.

Acer ginnala Maximowicz in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 126 (1857); in Mél. Biol. II. 415 (1857).—Rehder in Sargent, Trees & Shrubs, I. 179 (1905). Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1919). Bailey, Gent. Herb. I. 35 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).—Chung in Mem. Sci. Soc. China, I. 149 (Cat. Trees Shrubs China) (1924).

Acer Tataricum var. *Ginnala* Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 67 (Prim. Fl. Amur.) (1859); Enum. Pl. Mongol. 138 (1889).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 228 (Pl. David. I. 76) (1883).[1]

Acer tataricum Hemsley in Jour. Linn. Soc. XXIII. 142 (1886)[1].—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).

Acer ginnala subsp. *Eu-ginnala* Pax in Bot. Jahrb. VII. 185 (1886)[1].

CHILI: Hsiao Wu tai shan, *F. N. Meyer*, no. 1315, August 23, 1913.—See also Franchet, l. c., Hemsley, l. c., Pax. l. c., Maximowicz, l. c. (1889), Rehder, l. c., and Chung, l. c.

SHANTUNG: Confucius grave, *J. Hers*, no. 1923, June 19, 1922.—See also Loesener, l. c., and Chung, l. c.

NORTHERN KIANGSU: Siao Hsien, Huang tsang yu, *J. Hers*, no. 1051, May 26, 1919; Liu lin shan, near Hai chow, *J. Hers*, nos. 634, 667, May 5, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2260, 2286, October 8, 1922.

HONAN: Chi kung shan, *L. H. Bailey*, June 13, 1917; Mien-chih, alt. 800 m., *J. Hers*, no. 58, August 20, 1919. - See also Bailey, l. c., Hers, l. c., and Chung, l. c.

SHANSI: Wu tai shan, alt. 1600 m., *J. Hers*, no. 2639, July 27, 1923; Wen fu ho valley, alt. 1500 m., *J. Hers*, no. 2760, October 2, 1923; Tung tsa, *C. O. Lee*, July 1924. Herb. Univ. Nanking no. 6046.

KANSU: between Choni and Lanchow, alt. 2600-3000 m., *R. C. Ching*, no. 1022, Sept. 19-21, 1923.

DISTRIBUTION: also Anhwei, Kiangsi, Chekiang, Hupeh; Mongolia, Manchuria, Korea and Japan.

This species is very closely related to *A. tataricum* L. and some Chinese specimens with ovate-oblong leaves partly destitute of lobes have been referred to that species, but they differ from *A. tataricum* in the leaves being distinctly 3-nerved at the usually rounded base and 3-lobed at the base if lobed, while *A. tataricum* has the leaves generally ovate more or less palminerved at the rounded to cordate base and if lobed, there are usually several pairs of short lobes, the basal pair being smaller; furthermore, in *A. tataricum* the leaves are bright green and remain so when dried while those of *A. ginnala* are deep green above and usually turn to a dark color in drying.

Acer Buergerianum Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 88 (1865); Prol. Fl. Jap. 20 (1865).

[1] Franchet cites as the localities for David's nos. 1789, 2612 "Toumet, Sarchi," while Hemsley and Pax (1886) cite Jehol for David's no. 1789.

Acer trifidum Hooker & Arnott, Bot. Voy. Beechey, 174 (1841).—Faber in Denkschr. Entwick. Kiautschou, 33 (1898).—Pax in Bot. Jahrb. XXXIV. beibl. LXXV. 49 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1919).—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).—Non Thunberg.

SHANTUNG: without locality (ex Faber, l. c.).—See also Pax, l. c. Loesener, l. c., and Chung, l. c.

The occurrence of this species in Shantung remains doubtful, as Faber's record is not supported by specimens and the later citations are all based on Faber's list.

Acer oblongum Wallich apud De Candolle, Prodr. I. 593 (1825).

Acer oblongum l. *glaucum* Schwerin in Gartenfl. XLII. 228 (1893).—Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905), sub. var.

SHENSI: Miao uan san, *Hugh Scallan*, in 1898.—See also Pax, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan, Hunan, Chekiang, Fokien, Kwangtung; Formosa and Himalayas.

Acer discolor Maximowicz in Bull. Acad. Sci. St. Pétersb. XXVI. 436 (1880); XXVII. 560, t., fig. 6 (1882); in Mél. Biol. X. 589 (1880); XI. 589, t. fig. 6 (1881); in Act. Hort. Petrop. XI. 109 (1889).—Pax in Bot. Jahrb. VII. 187 (1886); in Engler Pflanzenr. IV.-162, 33 (1902).—Hemsley in Jour. Linn. Soc. XXIII. 140 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 996 (1898).—Rehder in Sargent, Trees & Shrubs, I. 180 (1905).—Chung in Mem. Sci. Soc. China, I. 148 (Cat. Trees Shrubs China) (1924).

SHENSI: along the Han River, *P. J. Piasezki* (ex Maximowicz, l. c.).—See also Pax, l. c., Hemsley, l. c., Rehder, l. c., and Chung, l. c

KANSU: plain in southeastern Kansu, *P. J. Piasezki* (ex Maximowicz, l. c.).—See also Pax, l. c., Hemsley, l. c., Rehder, l. c., and Chung, l. c.

DISTRIBUTION: endemic.

Acer Davidi Franchet in Nouv. Arch. Mus. Paris, sér. 2, VIII. 212 (Pl. David. II. 30) (1884).—Chung in Mem. Sci. Soc. China, I. 148 (Cat. Trees Shrubs China) (1924).

Acer Davidii var. β. *glabrescens* Pax in Engler, Pflanzenr. IV.–162, 36 (1902); in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).

Acer Davidii var. γ. *horizontalis* Pax, l. c., 79 (1902); 73 (1905), pro parte.—Rehder in Sargent, Trees & Shrubs, I. 168 (1905).

SHANSI: Lin kon shan, *K. Ling*, July 13, 1925, Herb. Univ. Nanking, no. 9346.

SHENSI: Mang hua shan, *G. Giraldi*, October to November, 1894; Miao wang san, and without precise locality, *Hugh Scallan*, in 1898; Tai pei shan, *W. Purdom*, no. 949, in 1910.

KANSU: Hsia Mo k'ou, near Lichen, alt. 2000–2300 m., *R. C. Ching*, no. 321, July 7 and 8, 1923.

DISTRIBUTION: also Anhwei, Chekiang, Kwangtung, Hupeh, Szechuan, Yunnan.

Acer Grosseri Pax in Engler, Pflanzenr. IV.–162, 80 (1902); in Bot. Jahrb. XXXVI. beibl. LXXXII. 74. (1905).—Rehder in Sargent, Trees & Shrubs, I. 181 (1905).

Acer Davidii var. *horizontalis* Pax in Engler, Pflanzenr. IV.–162, 79 (1902). in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905), pro parte.—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).

Acer Davidi var. *glabrescens* Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905), pro parte.

Acer Hersii Rehder, in Jour. Arnold Arb. III. 217 (1922), pro parte.

? CHILI: without precise locality, *Père Chanet*, no. 90, in 1919.—See also Rehder, l. c.

HONAN: Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 533, May 24, 1919; Lu shih, Lao kiun shan, alt. 200 m., *J. Hers*, no. 1169, September 21, 1919.—See also Pax, l. c., and Rehder, l. c.

SHENSI: Kiu ton san, *G. Giraldi*, July 14, 1897; Kan y san (type locality), Kian san, Ngo san and Thui kio tsuen, *Hugh Scallan*, 1897 and 1899; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2359, July 3, 1922; Tsing ling, 60 kilom. south of Sian fu, alt. 1000–1500 m., *J. Hers*, nos. 2950, 2999, October 20, 1924; Hua shan, alt. 1500 m., *J. Hers*, no. 3080, October 31, 1924.—See also Rehder, l. c.

KANSU: Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1758, October 1, 1914.

DISTRIBUTION: also Anhwei and Hupeh.

Though typical *A. Grosseri* is quite distinct from the related *A. Davidi*, there are specimens which seem to be intermediate between the two and which are here referred to the species they most resemble, but I am not sure if not most of the specimens enumerated above under *A. Davidi* should be referred to *A. Grosseri*. No intermediate forms seem to occur in the southern part of the range of *A. Davidi*. *Acer Grosseri* is also closely related to *A. Hersii* Rehd. and most of the specimens referred by me formerly to *A. Hersii* belong apparently to *A. Grosseri*. *Acer Hersii* has larger leaves about as broad as long, always distinctly 3-lobed with acuminate lateral lobes and sometimes even with an additional pair of small basal lobes, while in *A. Grosseri* the lateral lobes are very short not acuminate and often obsolete or entirely wanting on part of the leaves which are broad-ovate to ovate. The forms with ovate-oblong leaves resemble somewhat *A. laxiflorum* Pax, and *A. Maximowiczii* Pax, but these species have an elongated caudate terminal lobe and acuminate finely pointed teeth, the lateral lobes are acuminate and there is often a small basal lobe in the latter species, while in the former which has a closer and finer serration, the lateral lobes are usually shorter and broader and the basal lobes not developed.

Acer Hersii Rehder in Jour. Arnold Arb. III. 217 (1922), specimin*ibus* plurimis excludendis.

Acer sp. allied to *A. Grosseri* Bailey, Gent. Herb. I. 35 (1920).

HONAN: Teng feng hsien, Yu tai shan, Erh tsu an, alt. 800. m., *J. Hers*, nos. 219, 2780, April 23, 1919 (type), and September 27, 1923; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1739, September 21, 1921; Tsi yuan hsien, Pei ting shan, alt. 1200 m., *J. Hers*, no. 2800, October 10, 1923; Cheng chow, cultivated (from the hills), *J. Hers*, no. 2568, August 2, 1923; Chi kung shan, *L. H. Bailey*, June 16, 1917.

DISTRIBUTION: also Anhwei (*R. C. Ching*, no. 2789) and Hupeh (*A. N. Steward*, Herb. Univ. Nanking no. 9768).

When publishing *A. Hersii* as a new species I made the mistake to refer to it a number of specimens related to *A. Davidi*, but differing in their more or less lobed or lobulate leaves; these specimens I now consider to belong to *A. Grosseri* Pax which differs in its ovate to ovate-oblong leaves with two very short acute to obtusish lobes usually obsolete on part of the leaves on the same tree.

Acer Maximowiczii Pax in Hooker's Icon. XIX. sub t. 1897 (October, 1889); in Engler, Pflanzenr. IV.–162, 70 (1902); in Bot. Jahrb. XXXVI. beibl. LXXXII. 74 (1905).—Chung in Mem. Sci. Soc. China, I. 149 (Cat. Trees Shrubs China) (1924).

Acer urophyllum Maximowicz in Act. Hort. Petrop. XI. 105 (November, 1889).—Bretschneider, Hist. Eur. Bot. Discov. China, 1027 (1898).—Rehder in Sargent, Trees & Shrubs, I. 169, t. 84 (1905).

SHENSI: Ngo san and without precise locality, *Hugh Scallan*, 1899; Tai pei shan, *W. Purdom*, nos. 947, 948 (July 2), in 1910.—See also Pax, l. c. (1905), Chung, l. c., and Rehder, l. c.

KANSU: vicinity of Choni, alt. 3100–3300 m., *R. C. Ching*, no. 1009, September 7–15, 1923.—See also Pax, l. c. (1889, 1902), Maximowicz, l. c., Bretschneider, l. c., and Rehder, l. c.

DISTRIBUTION: also Hupeh.

Henry's no. 7557 from Honan which I enumerated in 1905 (l. c.), I have not now before me and I am unable to say whether it was correctly identified which I doubt.

Acer tetramerum Pax var. **betulifolium** Rehder in Sargent, Pl. Wilson. I. 95 (1911).—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).

Acer betulifolium Maximowicz in Act. Hort. Petrop. IX. 108 (1889).—Bretschneider, Hist. Eur. Bot. Discov. China, 781, 1027 (1898).—Pax in Engler, Pflanzenr. IV.-162, 10 (1902).; in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Rehder in Sargent, Trees & Shrubs, I. 181 (1905).—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).

SHENSI: Ngo san and Kan y san, *Hugh Scallan*, about 1898; Yenan fu, *W. Purdom*, no. 348, May, 1910; Valley leading to Tai pei shan, alt. 2100 m., *W. Purdom*, no. 438, July, 1910.—See also Rehder, l. c., Chung, l. c., and Pax, l. c. (1905).

KANSU: Tow River, alt. 2700 m., *W. Purdom*, no. 793, in 1910; Min chow, alt. 2100 m., *W. Purdom*, no. 1073, in 1910; Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1778, October 1, 1914; Hsia Mo k'ou, near Lichen, alt. 2000–2300 m., *R. C. Ching*, no. 323, July 7 and 8, 1923;

vicinity of Choni, alt. 3100–3300 m., *R. C. Ching*, no. 1008, September 7–15, 1923; Lian hwa shan mountains, southwest of Ti tao chow, alt. 3000–3300 m., *R. C. Ching*, no. 1010, September 20–21, 1923. See also Rehder, l. c., Maximowicz, l. c., Bretschneider, l. c., Pax, l. c., and Chung, l. c.

DISTRIBUTION of the var.: also Szechuan; of the species: also Hupeh, Szechuan, and Yunnan.

Some of the specimens as Purdom's nos. 348 and 438 and Scallan's specimen from Ngo san differ in their more deeply lobed and somewhat narrower leaves from typical var. *betulifolium*, but they agree with it in the lack of pubescence.

Acer Francheti Pax in Hooker's Icon. XIX. sub t. 1897 (1889).—Rehder in Sargent, Trees & Shrubs, I. 175, t. 87 (1905).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).—Chung in Mem. Soc. Sci. China, I. 149 (Cat. Trees Shrubs China) (1924).

HONAN: Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 523, May 24, 1919; without precise locality, *J. Hers*, no. 46, in 1918.—See also Hers, l. c., and Chung, l. c.

SHENSI: Tai pei shan, *W. Purdom*, no. 950, in 1910; near Kwang yin lang, *F. N. Meyer*, no. 1672, September 15, 1914.—See also Chung, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Acer pilosum Maximowicz in Bull. Acad. Sci. St. Pétersb. XXVI. 436 (1880); XXVII. 560, t., fig. 1–5 (1882); in Mél. Biol. X. 590, 604 (1880); XI. 350, t. fig. 1–5 (1881); in Act. Hort. Petrop. XI. 105 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 141 (1886).—Pax in Bot. Jahrb. VII. 187 (1886); in Engler, Pflanzenr. IV. 163, 12 (1902).—Bretschneider, Hist. Eur. Bot. Discov. China, 996 (1898).—Rehder in Sargent, Trees & Shrubs, I. 181 (1905).—Chung in Mem. Sci. Soc. China, I. 150 (Cat. Trees Shrubs China) (1924).

KANSU: road to Siku from Minchow, *W. Purdom*, no. 764 (seeds only; plants raised in Arnold Arb.; specimens in Herb.).—See also Maximowicz, l. c., Hemsley, l. c., Pax, l. c., Bretschneider, l. c., Rehder, l. c., and Chung, l. c.

DISTRIBUTION: endemic.

Acer griseum Pax in Engler, Pflanzenr. IV. 163, 30, fig. 5 (1902).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).—Chung in Mem. Sci. Soc. China, I. 149 (Cat. Trees Shrubs China) (1924).

HONAN: Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, nos. 544, 1299, May 24, and September 27, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 926, October 10, 1919; Lushih, Lao kiun shan, *J. Hers*, no. 1223, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1722, September 20, 1921.—See also Hers, l. c.

SHENSI: Hua shan, *J. Hers*, nos. 3051, 3068, October 31, 1924.
DISTRIBUTION: also Hupeh.

Acer Henryi Pax in Hooker's Icon. XIX. t. 1896 (1889).—Pax in Bot. Jahrb. XXXVI. beibl. LXXXII. 73 (1905).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 1 (1922).—Chung in Mem. Sci. Soc. China, I. 149 (Cat. Trees Shrubs China) (1924).

HONAN: Mien chih, alt. 800 m., *J. Hers*, no. 78, November 1, 1919; Teng feng hsien, Yu tai shan, alt. 1000 m., *J. Hers*, no. 273, June 17, 1919; Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 526, May 24, 1919; Sung hsien, Shih tze miao, *J. Hers*, no. 580, May 26, 1919; Lushih, Tungho, alt. 1000 m., *J. Hers*, no. 984bis, October 14, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1347, September 30, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1738, 1766, September 21, 1921; without precise locality, *J. Hers*, no. 21, in 1918.—See also Hers, l. c.

SHENSI: Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2364, July 3, 1922; Hua shan, alt. 1500 m., *J. Hers*, no. 3078, October 31, 1924.—See also Pax, l. c.

DISTRIBUTION: also Kiangsu, Chekiang, Hupeh and Hunan.

HIPPOCASTANACEAE

Aesculus chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 84 (Enum. Pl. Chin. Bor. 10) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. XI. 105 (1889).—Hance in Jour. Bot. VIII. 312 (1870).—Hemsley in Jour. Linn. Soc. XXIII. 139 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 331 (1898).—Pritzel in Bot. Jahrb. XXIX. 450 (1900).—Purdom in Gard. Chron. ser. 3, LXIV. 346, fig. 150-152 (1912).—Rehder in Sargent, Pl. Wilson. I. 499 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan Sept. 2 (1922).—Chung in Mem. Sci. Soc.. China, I. 151 (Cat. Trees Shrubs China) (1924).—Plate 2.

CHILI: Peking, *E. Bretschneider*, September 20, 1877; western hills, near Peking, in temple grounds, *W. Purdom*, no. 874, April 30, 1912; western hills near Peking, temple of the Sleeping Budda, *R. G. Mills*, July 25, 1923 (flowers).—See also Bunge, l. c., Maximowicz, l. c. (1859), Hance, l. c., Hemsley, l. c., Purdom, l. c., Rehder, l. c., and Chung, l. c.

HONAN: Sung hsien, Shih tze miao, alt. 1100, *J. Hers*, no. 485, May 26, 1919; Lushih, Luan chuan, alt. 800 m., *J. Hers*, no. 112, October 7, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1207, September 21, 1919.—See also Hers, l. c., and Chung, l. c.

SHANSI: Hia hsien, Low shan, *J. Hers*, no. 1876, October 3, 1921.

SHENSI: near Tze wu hsien, south of Sian fu, *F. N. Meyer*, no. 1725, September 1, 1914.—See also Pritzel, l. c.

DISTRIBUTION: endemic.

The specimens from Honan, Shansi and Shensi differ in the longer petiolules from typical *A. chinensis* and may represent a glabrescent or glabrous form of *A. Wilsonii* Rehd. such as occasionally occur in Hupeh and Szechuan; also the flowers of Hers' no. 485 from Honan (the other specimens are sterile) are as large as those of *A. Wilsonii*, but our material is yet too meagre to form a definite opinion and particularly fruits which seem to present well marked characters are wanting from the doubtful localities.

The photograph of two flowering trees reproduced on plate 2 was taken in temple grounds in the western hills near Peking and kindly presented by J. Hers of Peking to this Arboretum.

SAPINDACEAE

Koelreuteria paniculata Laxmann in Nov. Comm. Acad. Sci. Petrop. XVI. 561 (1772).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 85 (Enum. Pl. N. China) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. XI. 104 (1889).—David, Jour. Trois. Voy. Chin. I. 148 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 227 (Pl. David. I. 75) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 138 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 49, 159, 850 (1898).—Diels & Pritzel in Bot. Jahrb. XXIX. 450 (1900); XXXVI. beibl. LXXXII. 74 (1905).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib., 435 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan Sept. 16 (1922).—Chung in Mem. Sci. Soc. China, I. 152 (Cat. Trees Shrubs China) (1924).

CHILI: Peking, *C. A. Skatschkoff*, about 1850 (Gray Herb.), *S. W. Williams*, July 1876 (Gray Herb.); Peking on city wall, *F. N. Meyer*, no. 1013, July 12, 1913; ravine, Meng kow tow, *N. H. Cowdry*, no. 497, June 8, 1920 (sterile).—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c. (1859), Franchet, l. c., Hemsley, l. c., Bretschneider, l. c. (p. 49, 158), Limpricht, l. c., and Chung, l. c.

SHANTUNG: without precise locality, August 9, 1915, Herb. Univ. Nanking no. 529.

HONAN: without locality (ex Hers, l. c.).

SHANSI: Hsu chia chuong, *K. Ling*, no. 9266, July 11, 1925.

SHENSI: many localities, *G. Giraldi* (ex Diels & Pritzel, l. c.).—See also David, l. c., and Bretschneider, l. c. (p. 850).

KANSU: several localities, *G. N. Potanin* (ex Maximowicz, l. c. [1889]).

DISTRIBUTION: also Kiangsu, Yunnan, Korea.

I have not seen any specimens from Shensi and Kansu and therefore I am not sure if the specimens from these provinces or at least those from Kansu belong to this species or the closely related *K. apiculata* Rehd. & Wils. which occurs in Szechuan.

Xanthoceras sorbifolia Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 85 (Enum. Pl. Chin. Bor.) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. pt. VII. 150 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop, XI. 105 (1889); Enum. Pl. Mongol. 138 (1889).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 227 (Pl. David. I. 71) (1833).—Hemsley, in Jour. Linn. Soc. XXIII. 140 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 53, 319, 331 (1898).—Diels & Pritzel in Bot. Jahrb. XXIX. 451 (1900).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Seeds Pl. Imp. Inv. XII. 73, no. 18264 (1907); XIV. 55, no. 22457 (1909).—Loesener in Bot. Centralbl. Beih. XXXVII. pt. II. 152 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 117 (1922); Liste Ess. Lign. Honan Sept. 34 (1922).—Chung in Mem. Sci. Soc. China, I. 152 (Cat. Trees Shrubs China) (1924).

CHILI: near Peking, *F. N. Meyer*, no. 196, October, 1905 (Gray Herb.); loess cliffs, near Shih-wen, *F. N. Meyer*, no. 1072, August 2, 1913; Siao Wu tai shan, *J. Hers*, no. 1504, July 14, 1921.—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., Bretschneider, l. c., Meyer, l. c., and Chung, l. c.

SHANTUNG: Tsimo city, old tree in temple grounds (ex Loesener, l. c.).—See also Chung, l. c.

HONAN: cultivated, without locality (ex Hers, l. c.).

SHANSI: loess cliffs, Tsin tse, south of Tayan fu, *F. N. Meyer*, no. 411, May 5, 1907; loess cliffs, Chao yu, alt. 1200 m., *F. N. Meyer*, no. 1709, July 23, 1914.—See also Chung, l. c.

SHENSI: Tu kio, *G. Giraldi* (ex Diels & Pritzel, l. c.).

KANSU: Ho lan shan Mountains, alt. 1375–2400 m., *R. C. Ching*, no. 122, May 10–25, 1923.

DISTRIBUTION: also Mongolia.

In Shantung and Honan this tree occurs apparently only as a cultivated plant. The first introduction of this beautiful tree into western gardens is usually credited to Father David, who introduced it in 1866 to the Jardin des plantes in Paris, but according to Bretschneider (l. c. 319) there is a tree in the Botanic garden at Nikita, Crimea, about 70 years old in 1898, which was in all probability raised from seed sent by Russian missionaries from Peking about 1825.

(*To be continued*)

Taiwania cryptomerioides Hayata
Tree on Arisan, Formosa,
with Chamaecyparis formosensis Matsum. in the rear.

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TAIWANIA CRYPTOMERIOIDES HAYATA

Plate 3

ERNEST H. WILSON

THE Taiwania is the loftiest Conifer found in the northern parts of the Old World. It is an ancient type comparable with the Sequoia of western North America, and is known only from two widely separated regions, namely, the island of Formosa and extreme northwestern Yunnan. It was discovered on the mountains of central Formosa at the base of Mt. Morrison at an elevation of 2000 m. by N. Konishi in February 1904, and was described and figured by Hayata in the 'Journal of the Linnean Society," vol. XXXVII 330 (1906). In June 1916 it was found high up on the watershed of the Salween and Irrawadi Rivers by Dr. H. Handel-Mazzetti. It was introduced into cultivation by the Arnold Arboretum to whom I sent small plants from Formosa in 1918.

The Taiwania is both interesting and remarkable. On Arisan, in central Formosa, in a narrow belt between 2300 and 2600 m. altitude the Taiwania occurs scattered through the magnificent forests of *Chamaecyparis formosensis* Matsum., *C. obtusa*, var. *formosana* Hay., *Trochodendron aralioides* S. & Z., with evergreen Oaks, Symplocos and Lauraceae in abundance. In my opinion in ancient times with the Trochodendron it formed extensive forests but has been defeated in the struggle by the two Chamaecyparis and the present trees are mere survivals. On Matsu-yama, a mountain in the Arisan forest reservation, it is more common than on Arisan itself. On Hsokei-hen, a forest reservation belonging to the Imperial University of Tokyo, it grows in small groups among evergreen Oaks.

So far as my own observations go it is a rare tree in Formosa. Small trees are very uncommon and seedlings extraordinary rare. The young trees have pendent branchlets and in the shade of the forests the branches are sparse and the tree unattractive. In the open it is in youth a singularly beautiful and attractive Conifer, densely branched with graceful branchlets and attractive green foliage. Adult trees in the forests are strikingly distinct but singularly like old Cryptomeria trees, and both suggest gigantic Lycopods. In the dense forests the crown is small, domeshape, oval or flattened, the branches few and small and one wonders how so little leafage can support so gigantic a tree. When the top is broken lateral branches

assume an erect position. In more open forests the branches are massive and wide-spreading but the crown is thin.

In height the Taiwania over-tops all other trees on Arisan and probably attains upwards of 200 ft. The tallest I measured was 190 ft. high and 130 ft. to the first branch. The girth is up to 30 ft.; the trunk is straight and mast-like, buttressed at the base. The bark is red-brown, fibrous, and longitudinally fissured. The wood when green is heavier than water, when air dried its specific gravity is 0.46. There is very little sap wood which is pale in color; the heart wood is rich orange-red to mahogany brown with a purplish sheen becoming duller with exposure and age. It is strong, easily worked, but is not very durable. The trees are usually solid.

Seedling plants are very rare in the forest and totally different in appearance to the adult trees. Healthy young specimens are pyramidal in outline with branches from the ground up. The branches are numerous ascending-spreading, with more or less hanging branchlets and densely clothed with falcately spreading lance-shaped leaves, each from 1 to 1.5 cm. long, pungent in the apex and decurrent at the base. The foliage and branchlets are a rich dark green and the whole aspect of the plant is distinctly ornamental. Later in life the leaves are almost scale-like with incurved apices, and are closely imbricated and appressed round the branches. The dissimilarity between young and old trees in amazing. The small inner branchlets are shed in the same manner as are those of Cryptomeria, Cunninghamia and Sequoia. On one occasion I found a sprout from the root of an old tree.

The Taiwania is essentially a light demanding tree, and in Formosa favors northerly and northeasterly exposures. It is polygamo-dioecious, and fruit is found on the tops of the oldest trees only. Male flowers on some trees are exceedingly abundant. The cone is small, ovoid barrel-shape, from 1 to 2 cm. long, with numerous thin, flexible cone-scales. The cones are terminal and subsessile, and the leaves on the shoot near the base of the cone are reduced to bract-like scales.

My observations in Formosa lead me to believe that long ago Taiwania and *Cunninghamia Konishii* Hayata, covered vast areas of the mountains between two and three thousand metres elevation with pure forests even as at lower elevations did Keteleeria and Libocedrus. Probably in places Taiwania and the Cunninghamia grew together in luxuriant association-ship. Today these four species of trees are mere relics. Broadleafed trees have crowded out the Keteleeria and Libocedrus and *Chamaecyparis formosensis* Matsum, and its sister *C. obtusa* var. *formosana* Matsum. have done the same to the Taiwania and Cunninghamia. The Taiwania as an isolated tree still rears its crown above the tallest Chamaecyparis and dominates the scene but its seeds cannot germinate in the dense forest depths, and it is rarely that one can see a young or even middle-aged Taiwania in the forest.

The finding of Taiwania in northwestern Yunnan is one of the most in-

teresting discoveries in recent work on the Chinese flora. The exact locality is given by Dr. Handel-Mazzetti as near Ninalo west of Channutung, which is west of Tsekou on the Salween River. There in side valleys, between 2300 and 2800 m. altitude he found giant trees which in habit and bark reminded him of Sequoia. The occurrence of Taiwania in western China and on the mountains of Formosa and at no place in between these widely separated regions is a remarkable fact in plant distribution.

I was fortunate enough in 1918 to secure three young seedling plants in the forests on Arisan and from the Forestry Station at Keitao obtained a small nursery grown plant. These were safely brought to the Arnold Arboretum. We have found that the plant roots easily from cuttings. During my visits to Formosa I collected a great many seeds of the Taiwania but none of them proved viable. In the late autumn of 1924, through the good services of my friend, R. Kanehira, the Arnold Arboretum received seeds which germinated quickly and we now have a nice stock of young plants. On these seedlings the normal number of cotyledons is two, but occasionally three are present.

Native of a mild, wet climate there is no possibility of the Taiwania being hardy in New England. In view of this fact the Arnold Arboretum has distributed the Taiwania among regions enjoying a more suitable climate. Of the original four seedlings brought home three have been sent to different establishments in this country where they are flourishing and the fourth was sent to Royal Gardens, Kew. The plants raised from cuttings have been distributed to botanic gardens in South America, Africa, Asia and Australasia. From several establishments we have reports of the plants growing well. The plants raised from seeds sent by R. Kanehira are now being distributing far and wide. A few years should see this most interesting Conifer firmly established in botanical and other gardens throughout the world.

A NEW SPECIES OF PARAMIGNYA FROM PAPUA WITH NOTES ON TWO OTHER PAPUAN RUTACEAE

C. T. White

Paramignya Brassii, sp. nov.

Frutex 2 m. altus, ramis pendulis (sec. Brass); ramuli spinis numerosis singularibus vel geminatis 0.8–1.5 cm. longis tenuibus puberulis sed in fruticibus majoribus et luxuriosioribus evanescentibus muniti. Folia nitida, atroviridia (sec. Brass), breviter petiolata petiolo puberulo 2–3 mm. longo, lamina magnitudinis variabilissimi, in ramulis florentibus modo parvis (1.5 : 0.8 cm.) modo multo majoribus (usque ad 4 : 3 cm.), ovato-rhomboidea, ad apicem retuse acuminata, nervis praecipuis lateralibus utrinque 5–6 supra et subtus subprominentibus. Flores suaveolentes (sec. Brass), axillares, solitarii, pedunculati pedunculo glabro apicem versus

sensim incrassato ca. 1 cm. longo; calyx 5-lobatus lobis late deltoideis circiter 1 cm. longis marginibus ciliolatis; petala 5, obovata, 1 : 0.3 cm. magna, extus apicem versus glandulis magnis numerosis punctata; stamina 10, filamentis liberis 6 mm. longis, antheris linearibus 2 mm. longis; ovarium lageniforme, breviter stipitatum stipite in sicco irregulariter subcostato, stylo crasso costato 5 mm. longo, stigmate discoideo. Bacca coccinea, formae variabilis, ellipsoidea, pyriformis vel obovoidea, 3 cm. longa, 1.5–2 cm. diam., 5-locularis, pulpa exigua, seminibus 1 vel 2 in quoque loculo, 1 : 0.6 cm. magnis.

PAPUA: Rigo, *L. J. Brass*, no. 817, December 9, 1925 (type; flowering and fruiting specimens; slender bush, attaining 6 ft., branches drooping, leaves glossy, dark green; flowers sweetly scented; fruit various, bright scarlet when ripe, up to 3 cm. long and 2 cm. diam, pulp scanty, insipid, rather sweet, oil-glands, numerous, seeds large; common on rich creek flats, small stunted bushes, very spiny, well grown plants almost unarmed); Rigo, Rev. *R. Lister Turber* (shrub, flowers white, single, sweetly scented, flowers in January; fruit a red berry about twice the size of the cultivated lime berry; common in the Rigo Valley); Boku, Mrs. *H. P. Schlencher;* Yule Island, *C. T. White*, no. 738 (shrub of straggling growth, among scrubby vegetation near the coast).

I had long known of the presence of this plant in Papua, but all the material hitherto received was too fragmentary to describe from. I was therefore particularly glad under the circumstances, to see the fine series of specimens represented by Mr. Brass's No. 817. The genus is not recorded as Papuan in Lauterbach's account of the Papuan Rutaceae (Beiträge zur Flora von Papuasien, VI. no. 59 in Bot. Jahrb. LV. 221–265 [1918]) so the present record extends considerably its hitherto known range.

Citrus Warburgiana F. M. Bailey. Lauterbach (l.c.) overlooked (perhaps excusably) two species of Citrus described and figured by F. M. Bailey in the "Annual Report on British New Guinea" 1900–1901, 142, the first of these *Citrus papuana* Bail. is in my opinion referable to the widely distributed *C. hystrix* (L.) DC., the other, *C. Warburgiana* Bail., is only imperfectly known but would seem to come close to *C. paludosa* Warb., and could be placed in Lauterbach's key to the Papuan species as follows:

Leaf margins crenulate or irregularly toothed.

Leaves lanceolate, 7–14 × 2–5 cm. *C. paludosa.*

Leaves lanceolate, 5–7 × 1–2 cm. *C. Warburgiana.*

Lunasia quercifolia (Warb.) Lauterb. & Schum. var. **lanceolata,** var. nov.

A typo foliis integris (non sinuato-dentatis) et lanceolatis (non oblongo-obovatis) recedit.

PAPUA: Budatobara, alt. 100 m., *L. J. Brass*, no. 761. A large slender shrub 8 ft. growing in light rain forest.

This new variety differs from the type in the leaves being entire or almost so, not sinuate-dentate and lanceolate, not oblong-obovate in outline.

Lauterbach (in Bot. Jahrb. LV. 249 [Beitr. Fl. Papuas. VI] [1918]) has referred to the variability in leaf shape of the closely allied *L. amara* Blanco. The present specimens are in fruit only but have the carpels and vestiture of *L. quercifolia*. I hesitated a long time before applying a varietal name to this form particularly after the receipt of specimens intermediate between it and the type but the foliage is so very different from the type that the bestowal of a distinct varietal name seems justified.

The typical form of the species was collected by Brass on the banks of the Ioloki River (no. 1646). The intermediate form alluded to above was collected at the headwaters of the U-uma River, Eastern Division, at an altitude of 500 m. (L. J. Brass, no. 1459); its leaves differ from the type in being narrower (oblanceolate or narrowly obovate) and in not being very deeply indented, in fact sometimes almost entire.

BOTANIC GARDENS
BRISBANE, AUSTRALIA

MONIMOPETALUM, A NEW GENUS OF CELASTRACEAE

ALFRED REHDER

Monimopetalum,[1] gen nov.

Flores 4-meri, hermaphroditi (ut videtur); sepala parva, patentia, erosociliata; petala sepalis multoties longiora, patentia, spathulata, leviter crenulata vel rarius dentata, persistentia; discus annularis, leviter lobatus, planus; stamina in disco ad basin ovarii inserta, filamentis brevissimis, antheris subglobosis: ovarium 4-merum, stylo brevissimo vel obsoleto. Fructus capsularis, petalis multo brevior, loculo unico tantum evoluto vel loculis duobus, rarius 3–4, ad basin fere partitis oblongis subteretibus apice obtusiusculis extus obtuse mucronulatis; locula coriacea, sutura ventrali dehiscentia, monosperma; semen sessile, erectum, oblongum, basi arillo annulari crasso instructum; albumen carnosum; embryo majusculus rectus, cotyledonibus planis ovalibus viridibus, radicula infera.—Frutex volubilis vel scandens, inermis, ramis teretibus; gemmae pluriperulatae perulis angustis acuminatis: folia decidua, alterna, petiolata, serrulata, stipulis subulatis: inflorescentiae solitariae vel binae e gemmis lateralibus in parte superiore ramulorum annotinorum, ter quaterve dichotomae, bracteis parvis persistentibus instructae, floribus pedicellatis.

Hoc genus novum Evonymo proximum videtur sed differt praecipue arillo brevi annulari, petalis elongatis persistentibus, inflorescentiis e gemmis lateralibus ramulorum annotinorum ortis; etiam habitu scandente et foliis alternis a plurimis Evonymi speciebus abhorret et eis characteribus Celastro simile sed floribus isomeris primo intuitu distinctum.

[1] Name from Greek μόνιμος, lasting, and πέταλον, petal; in reference to the persistent petals.

Monimopetalum chinense, sp. nov.

Frutex circiter 6 m. alte scandens, inflorescentiis exceptis glaber, ramis gracilibus subteretibus hornotinis viridibus, annotinis intense rubro-fuscis, vetustioribus cinereis lenticellatis; gemmae pluriperulatae perulis anguste lanceolatis setoso-acuminatis laciniato-ciliatis. Folia graciliter petiolata petiolo 5–10 mm. longo, oblongo-ovata vel anguste elliptico-ovata, 4.5–8.5 longa et 1.5–3 cm. lata, longe acuminata, basi late cuneata vel interdum fere rotundata, satis dense vel interdum remotius serrulata dentibus parvis glanduloso-mucronulatis, utrinque nervis 4–6 curvatis supra et subtus prominulis, costa media supra leviter subtus magis elevato, supra laete viridia, subtus paulo pallidiora, tenuiter membranacea: stipulae setaceo-subulatae, ad 4 mm. longae, fuscae, persistentes. Inflorescentiae fructiferae (floriferas et flores non vidi), circiter 3 cm. longae et latae, pedunculo brevi vel ad 5 mm. longo, axibus secundi et tertii ordinis et pedicellis 5–8 mm. longis gracilibus, ut pedicelli minutissime puberulis; bracteae ovato-oblongae, circiter 1.5 mm. longae, obtusiusculae, plus minusve laciniato-ciliatae, fuscescentes; calyx 3 mm. diam., sepalis patentibus orbiculari-ovatis, acuminulatis, eroso-ciliolatis; petala patentia, spatulato-oblonga, 8–10 mm. longa, obtusa, basi attenuata, leviter crenulata vel fere integra, rarius dente unico instructa, in sicco albo-virescentia; capsulae lobi oblongi, leviter extus curvati, apice mucronulati, 3 mm. longi, pallide luteo-virescentes; semen oblongum, 2.5 mm. longum, atrofuscum, nitens, testa cartilaginea, minutissime foveolato-reticulato, imo basi arillo crasso annulari leviter lobulato circumdatum.

China. Southern Anhwei: Cheman, alt. 130 m., ravine, *R. C. Ching*, no. 3096, August 2, 1925.

This interesting new Celastraceous genus belongs on account of its capsular fruit and isomerous flowers to the Celastroideae-Evonymeae and is closely related to Evonymus but differs chiefly in the short annular aril, the persistent elongated sepals and in the inflorescence appearing from the axils of the branches of the previous season; it also differs from most species of Evonymus in the climbing habit, the alternate leaves and in the always one-seeded locules of the fruit; also the locules of the ovary are apparently one-ovuled, for I could find no trace of a second ovule in the mature fruit. In the unequal development of the locules the fruit shows great similarity to that of *Evonymus alatus* Reg., since usually only one or two, rarely 3 or 4 locules of the subglobose ovary develop into oblong pods connected only at the base with each other and the undeveloped locules.

MAGNOLIACEAE COLLECTED BY J. F. ROCK IN YUNNAN AND INDO-CHINA

Ernest H. Wilson

Magnolia L.

Magnolia mollicomata W. W. Smith in Notes Bot. Gard. Edinb. xii. 211 (1920).

Magnolia rostrata W. W. Smith in Notes Bot. Gard. Edinb. xii. 213 (1920), in part, as to the description of the flower.

Yunnan: Salween-Irrawadi watershed, region of Champutong, alt. 2750 m., *J. F. Rock*, no. 11517, in 1923 (tree 35 ft.).

Magnolia Nicholsoniana Rehder & Wilson in Sargent, Pl. Wilson. i. 394 (1913).

Yunnan: between Chienchuan plain and the Mekong drainage basin to Lachiming, alt. 2750 m., *J. F. Rock*, nos. 8639, 8620, May, 1923 (flowers white and fragrant).

Rock describes his no. 8639 as a shrub with long rambling branches; his no. 8620 as a climbing shrub which seems very doubtful. Both numbers are flowering specimens.

Magnolia globosa Hooker f. & Thomson, Fl. Ind. i. 77 (1855).—King in Ann. Bot. Gard. Calcutta, iii. 208, fig. 50 (1891).

Magnolia globosa var. *sinensis* Rehder & Wilson in Sargent, Pl. Wilson. i. 393 (1913).

Magnolia tsarongensis W. W. Smith & Forrest in Notes Bot. Gard. Edinb. xii. 215 (1920).

Yunnan: Salween-Irrawadi watershed, region of Champutong, alt. 2750–3300 m., *J. F. Rock*, nos. 10209, 11231 (small tree 8 ft., flowers white).

The young shoot is clothed with rufous-brown villose pubescence; the under surface of the leaves is densely clad with short, appressed villose tomentum either gray or rufous-brown in color. As a rule the rufous color is most pronounced on the primary and secondary veins. With the advent of numerous specimens collected by G. Forrest, by J. F. Rock, and by H. Handel-Mazzetti, I am satisfied that the plant I collected in western Szechuan and made the type of var. *sinensis* Rehder & Wilson and that of Forrest on which *M. tsarongensis* W. W. Smith is based are all referable to the typical Sikkim species of Hooker f. & Thomson.

Magnolia rostrata W. W. Smith in Notes Bot. Gard. Edinb. xii. 213 (1920), in part, excluding the description of flower.

Yunnan: Salween-Irrawadi watershed, slopes of the Ssu ti Tung, or Nualo, Salween Ridge, *J. F. Rock*, no. 10160, in 1923 (tree 30 to 50 ft.); Mt. Kenyichunpo and region of Champutong, *J. F. Rock*, no. 11215, in 1923 (tree 25–30 ft.).

Rock describes the flowers of his no. 10160 as white, those of his no. 11215

as red, but both specimens are with ripe fruit; the leaves are magnificent, the largest being 50 cm. long and 32 cm. wide.

This species flowers after the leaves appear and is closely related to the Japanese *M. oborata* Thunb. and *M. officinalis* Rehd. & Wils. of central China. The species is really based on fruiting material which is fortunate. The flowers described by Smith on the collector's authority do not belong to this species but are those of *M. mollicomata* W. W. Smith, a species which produces flowers before the leaves and is related to *M. denudata* Desrousseaux, the mistake evidently being due to the mixing of material.

Magnolia nitida W. W. Smith in Notes Bot. Gard. Edinb. XII. 212 (1920).

YUNNAN: Salween-Irrawadi watershed, Champutong, alt. 2600-2750 m., *J. F. Rock* no. 10235 (tree 25-30 ft.); Mt. Kenyichumpo and region of Champutong, alt. 2600-3300 mm., *J. F. Rock*, nos. 10136, 11232 (tree 35-38 ft.).

Rock says the flowers are white but his specimens are all in fruit.

Magnolia Delavayi Franchet, Pl. Delavay. I. tt. 9, 10 (1889).—Sprague in Bot. Mag. CXXXV. t. 8282 (1909).

YUNNAN: Head waters of the Red River, mountains beyond Maokai, alt. 2300 m., *J. F. Rock*, no. 3040, April 8, 1922 (tree 25 ft.); Yangtsze watershed, district of Likiang, eastern slopes of Likiang snow range, *J. F. Rock*, no. 3998, May, 1922 (tree 40 ft., flowers creamy white); Mountains of the Yangpi River drainage basin, *J. F. Rock*, no. 6257, August, 1922 (tree 30 ft., flowers white).

Michelia L.

Michelia yunnanensis Franchet apud Finet & Gagnepain in Bull. Soc. Bot. France, LII. (Mém. IV. 43) t. 6, fig. a (1906); Contrib. Fl. As. Or. II. 43 (1907).

YUNNAN: Yangtsze watershed, western slopes of Likiang snow range, cultivated at Lamassu, *J. F. Rock*, no. 10661, in 1923-24; between Likiangfu and Yunnanfu, mountains above Maton shan and Mongah shan, altitude 2750 m., *J. F. Rock*, nos. 11737, 11744, March, 1924 (shrub 1-4 ft., flowers cream-color).

Michelia floribunda Finet & Gagnepain in Bull. Soc. Bot. France, LII. (Mém. IV. 46, t. 7, fig. b) (1906); Contrib. Fl. As. Or. II. 46 (1907).

YUNNAN: Near Szemao, *J. F. Rock*, no. 2766, March 3, 1922 (tree 40 ft.); between Tengyueh and Talifu, alt. 1900 m., *J. F. Rock*, no. 9625, February, 1923 (tree 20 ft., flowers yellowish, fragrant); Shweli River drainage basin and environs of Tengyueh, Shui-yui-ssu, *J. F. Rock*, nos. 7933, 7961, February, 1923 (tree 20-45 ft., flowers cream-color, fragrant); East of Tengyueh near Tien-yui-ssu, *J. F. Rock*, nos. 7739, 7888, November, 1922, March, 1923 (tree 15-30 ft., flowers cream-color, fragrant).

Michelia champaca Linnaeus, Spec. 536 (1753).—King in Ann. Bot. Gard. Calcutta, III. 216, t. 64 (1891).

SIAM: Chiengmai province, Ban-meh-ki Schoolhouse, *J. F. Rock*, no. 1878, January 18, 1922 (tree 40 ft.).

Michelia manipurensis Watt apud Brandis, Ind. Trees, 8, (1906).

YUNNAN: Shweli River drainage basin, environs of Tengyueh, *J. F. Rock*, no. 8015, February, 1923 (tree 40 ft., flowers rich yellow, somewhat fragrant).

Michelia lanceolata, sp. nov.

Ramuli satis robusti, purpureo-brunnei, manifeste lenticellati, hornotini dense tomento villoso rufo-brunneo obtecti. Folia lanceolata vel oblongo-lanceolata, 10–20 cm. pleraque 15–20 cm. longa, 2.5–5.5 cm. lata, acuta, basi abrupte rotundata vel cuneata, supra nitida, intense viridia, reticulata, sparse villosa, subtus dense pilis adpressis sericeis griseis vestita, costa media supra impressa, subtus elevata et rufo-brunneo-tomentosa, nervis secundariis erecto-patentibus, ante marginem anastomosantibus subtus prominentibus; petioli 1–1.5 cm. longi, dense breviter brunneo-villosi. Flores axillares, solitarii, cremei, alabastra oblongo-ovoidea, pedunculati pedunculo 1.2–1.5 cm. longo ut bractea dense pilis nitentibus rufo-brunneis villosis vestito; sepala et petala subaequalia, 15–18, oblongo-spathulata, 3.5–4 cm. longa et 0.5–1 cm. lata, rotundata vel acuta, basi attenuata, exteriora basi villosa; stamina 1.2 cm. longa, filamentis 2 mm. longis, antheris acuminatis; gynophorum circiter 1 cm. longum ut axis anguste ovoidea circiter 1 cm. longa dense tomento rufo-brunneo villoso vestitum; stigma subulatum. Fructus non visus.

YUNNAN: Mekong watershed west of Talifu en route to Youngchang and Tengyueh, *J. F. Rock*, no. 6919, September–October, 1922.

A very distinct plant apparently most closely related to the Himalayan *M. lanuginosa* Wallich which has broader and larger leaves, a gray tomentum on shoot, leaf and flower, and sessile flowers.

Schisandra Michx.

Schisandra sphenanthera Rehder and Wilson in Sargent, Pl. Wils. I. 414 (1913).

Schizandra chinensis Diels in Bot. Jahrb. XXIX. 322 (1900), not Baillon.

YUNNAN: Yangtsze watershed, prefectural district of Likiang, eastern slopes of the Likiang snow range, *J. F. Rock*, no. 4299, May, 1922; flowers yellow, tinged pink. Mount Lauchunshan, southwest of the Yangtsze bend at Shiku, *J. F. Rock*, nos. 9602, 9603, in 1923; flowers white or red.

Schisandra glaucescens Diels in Bot. Jahrb. XXIX. 323 (1900).

YUNNAN: West of Talifu, Mekong watershed, en route to Youngchang and Tengyueh, *J. F. Rock*, no. 6825, September–October, 1922.

Schisandra rubriflora Rehder & Wilson in Sargent, Pl. Wilson. I. 412 (1913).

YUNNAN: Yangtsze watershed, prefectural district of Likiang, eastern slopes of Likiang snow range, *J. F. Rock*, no. 3399, May-October, 1922 (flowers deep magenta).

Schisandra elongata Hooker f., Fl. Brit. Ind. I. 44 (1872).

Sphaerostema elongatum Blume, Fl. Jap. III. 17, t. 5 (Schizandrae) (1851).

YUNNAN: Mountains south of Likiang near Hochin and Chiuho, *J. F. Rock*, no. 4039, May 25–28, 1922 (flowers yellow); Mekong Valley en route to Anwal, *J. F. Rock*, no. 8933, June, 1923 (flowers yellowish red).

Schizandra grandiflora var. **cathayensis** Schneider in Bot. Gaz. LXIII. 522 (1917).

YUNNAN: Between Chienchuan plain and the Mekong drainage basin to Lachiming, alt. 3400 m., *J. F. Rock*, no. 8595, May, 1923 (flowers rose-pink to white).

Illicium L.

Illicium yunnanense Franchet apud Finet & Gagnepain in Bull. Soc. Bot. France, LII. Mém. IV. 29 (1906); Contrib. Fl. As. Or. II. 29 (1907).

YUNNAN: Tsangshan range, between Tatzang and Hsiakuan, *J. F. Rock*, no. 2104, April 13, 1922 (shrub or small tree 10 ft.) between Tengyueh and Talifu, alt. 2750–3300 m., *J. F. Rock*, no. 9616, February, 1923 (tree 25 ft., flowers yellowish, fragrant); Salween-Irrawadi watershed, slopes of Champutong snow range, alt. 3300 m, *J. F. Rock*, no. 10232, in 1923 (tree 25 ft.); Mountains of the Yangpi River drainage basin, *J. F. Rock*, no. 6247, August, 1922; Shweli River drainage basin and environs of Tengyueh, alt. 3300 m., *J. F. Rock*, nos. 8003, 8018, February, 1923 (tree 25 ft., flowers pale yellow); between Talu and Hwaping, alt. 2600 m., *J. F. Rock*, no. 11725, March, 1924 (tree 15–18 ft., flowers yellow).

Illicium burmanicum, sp. nov.

Frutex vel arbor parva, 4–6 m. alta, glaberrima; ramuli robusti, annotini cinerei. Folia in apice ramulorum congesta, subcoriacea, oblongo-lanceolata vel oblongo-oblanceolata, interdum lanceolata, petiolo excluso 7–11 cm. longa et 2.5–4 cm. lata, acuminata et apiculata, basi late cuneata, obsolete et irregulariter crenato-serrata, supra intense viridia, costa supra impressa subtus elevata, nervis secundariis horizontalibus vel paullo ascendentibus ante marginem anastomosantibus, subtus satis prominulis; petioli 1.5–3 cm. longi, supra canaliculati. Flores solitarii, axillares, nutantes; alabastra late ovoidea, squamis suborbicularibus ciliolatis; pedunculi decurvi, circiter 1 cm. longi, bracteis pluribus membranaceis suffulti; sepala late ovata, 1 cm. longa, ciliolata; petala circiter 15, alba, purpureo-tincta, oblonga, 1.5–1.8 cm. longa et 2–4 mm. lata, interiora angustiora, apice rotundata; staminea numerosa, circiter 5 mm. longa,

filamentis 2 mm. longis compressis, antheris obtusis; carpella 8–9, stigmate recurvo. Fructus non visus.

BURMAH: between Sadon and the Yunnan border at Changtifang and Kambaiti, *J. F. Rock*, nos. 7408 (type), 7377, November, 1922.

This new species is most closely related to *I. manipurense* Watt which has much longer erect peduncles, not furnished with enveloping persistent bracts at the base.

Tetracentron Oliv.

Tetracentron sinense Oliver in Hooker's Icon. XIX. t. 1892 (1889). — Bean in Kew Bull. Misc. Inform. 1909, 356, fig.

YUNNAN: Mekong Valley, mountains of Kangpu, Yetche and Anwal, *J. F. Rock*, no. 8932, June, 1923; tree 12–15 ft., flowers yellowish.

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM[1]

ALFRED REHDER

Juniperus monosperma Sarg. f. **gymnocarpa,** comb. nov.

Juniperus occidentalis var. (c) *gymnocarpa* Lemmon, Handb. West-Am. Conebearers, ed. 3, 80 (1895).

This form differs in its more or less exserted seeds. Lemmon reported it from the Sandia Mountains near Albuquerque, New Mexico; I have also seen it from two localities in Colorado and collected it myself near Flagstaff, Arizona.

× **Quercus ludoviciana** var. **microcarpa,** comb. nov.

Quercus phellos microcarpa Dippel, Handb. Laubholzk. 108, fig. 49 (1892).
Quercus subfalcata var. *microcarpa* Sargent in Bot. Gaz., LXV. 454 (1918).
Quercus chinensis microcarpa Wezelenburg ex Sargent, l.c., as synon.

If *Q. pagoda* Raf. (*Q. pagodaefolia* Ashe) is considered a variety of *Q. rubra* as is done by Sargent in his Manual of the trees of North America and by other authors, the two hybrids described as *Q. ludoviciana* Sarg. (*Q. phellos* × *rubra* var. *pagodaefolia*) and *Q. subfalcata* Trel. (*Q. phellos* × *rubra*) are hybrids between the same species; therefore they have to be classed under the same binomial, and as *Q. ludiriciana*, published in 1913 has priority of *Q. subfalcata* published in 1917 the former name has to be accepted as the valid binomial.

The origin of var. *microcarpa* is not known, but it seems to be an old inhabitant of the gardens of Europe. According to specimens in this herbarium it was cultivated in Kew in 1880 as *Q. robur microcarpa*, received from the Booth Nursery in Flottbeck near Hamburg apparently under this name. I collected it myself in the nurseries at Muskau, Silesia, in 1888 under the name *Q. microcarpa* and Dippel states that he received it from the same nurseries as *Q. phellos microcarpa*, while the plant in this

[1] Continued from vol. VII. p. 149.

Arboretum was obtained in 1903 from the nurseries of Wezelenburg & Sons in Hazerswoude, Holland, under the name of *Q. chinensis microcarpa*.

The hybrid between *Q. phellos* and *Q. rubra* may be distinguished from typical *Q. ludoriciana* as:

× **Quercus ludoviciana** var. **subfalcata**, var. nov.

× *Quercus subfalcata* Trelease in Proc. Am. Phil. Soc. LVI. 52 (1917).

Hydrangea macrophylla f. **Hortensia**, comb. nov.

Viburnum macrophyllum Thunberg, Fl. Jap. 125 (1784).

Hydrangea macrophylla De Candolle, Prodr. IV. 15 (1830). –Wilson in Jour. Arnold Arb. IV. 234 (1923).

Hydrangea japonica η. *Hortensia* Regel in Gartenfl. XV. 290 (1866).

Hydrangea japonica η. *plena* Regel, l.c.

For further synonyms see Wilson, l.c.

This form is the nomenclatorial type of *H. macrophylla*, but in all such cases in which the type of a species has been based on a monstrous or unusual form, it seems best to use a varietal name for this particular form to avoid any confusion with the phylogenetic type, since the binomial embraces the whole group of forms placed under the species and is often used to designate chiefly the phylogenetic type.

Regel distinguished as *H. japonica* var. *plena* a form which differs from his var. *Hortensia* only in the toothed very large sepals, but toothed sepals occur also occasionally in typical *H. macrophylla Hortensia*, and it seems advisable to unite these slight variations under one name.

Indigofera amblyantha var. **Purdomii**, var. nov.

A typo recedit floribus majoribus pallide lilacino-violaceis vexillo circiter 8 mm. longo et 6 mm. lato apice vix vel leviter cochleato, racemis quam folia longioribus.

CULTIVATED: Arnold Arboretum, no. 7617 (raised from seed sent by W. Purdom from North China), June 23, 1917.

This variety differs from the type in its larger flowers, the standard being about 8 mm. long and 6 mm. wide, nearly flat and light mallow-purple (Ridgway pl. XII), while the wings are slightly shorter, 3 mm. broad and Tyrian pink (Ridgway pl. XII). In the typical form the standard is 6–7 mm. long and 4–5 mm. wide, more or less hooded at the apex and of a more pinkish color. On account of its larger flowers it is handsomer than the typical form.

Buxus microphylla Sieb. & Zucc. var. **koreana** Nakai apud Wilson in Jour. Arnold Arb. I. 35 (1920), nomen nudum.

Buxus japonica Palibin in Act. Hort. Petrop. XVIII. 188 (1900). –Not Mueller Arg.

Buxus microphylla Nakai, [Fl. Quelpaert Isl.] 60 (1915?). –Not Siebold & Zuccarini.

Buxus microphylla var. *riparia* Trollope in Trans. Korea Branch Roy. As. Soc. XI. 42 (1920). –Not Makino.

Buxus microphylla v. *Sinica* Mori, Enum. Pl. Korea, 235 (1922).—Not Rehder & Wilson.

A typo praecipue recedit ramulis junioribus petiolisque plus minusve breviter pilosis, foliis latioribus, floribus terminalibus et axillaribus.—Frutex 25–60 cm. altus, erectus. Folia elliptica vel anguste elliptica, rarius obovata vel late obovate, interdum elliptico-ovata, 6–15 mm. longa, 4–8 mm. lata, apice obtusa vel leviter emarginata, margine revoluta, interdum supra ad costam mediam basin versus sparse brevissime pilosa, crasse coriacea.

KOREA. Prov. Keiki: near Keijyo, common on side of streams on rotten granite base of Kwangaku-san, *E. H. Wilson*, no. 9625, November 23, 1917 (type); Nan-kan-san, side of torrent, *E. H. Wilson*, no. 10742, September 23, 1918. Prov. North Chusei: Baiho-rei near Tanyo, *E. H. Wilson*, no. 9631. Quelpaert Island, "in silvis, Sampangsan," *T. Taquet*, no. 1379, October, 1906.

CULTIVATED: Arnold Arboretum, under no. 11323 (introduced from Korea in 1919), October 10, 1919, July, 1922, April 1, 1925.

This variety differs from typical *B. microphylla* Sieb. & Zucc. and from var. *japonica* (Muell. Arg.) Rehd. & Wils. and var. *riparia* Mak. chiefly in its pubescent branchlets and petioles, from var. sinica Rehd. & Wils. in its low stature and smaller and thicker leaves. Taquet's specimen from Quelpaert is less typical and has less pubescent branchlets and slightly larger leaves.

Aesculus glabra var. **Sargentii**, nom. nov.

Aesculus glabra var. *arguta* Robinson in Gray, Syn. Fl. N. Am. II. pt. I, 447 (1897), in part.—Robinson & Fernald, Gray's New Man. ed. 7, 560 (1908), in part.

Aesculus glabra var. *Buckleyi* Sargent, Silva, XIV. 99 (1902), as to the range "Iowa and Kansas;" Man. 645 (1905), in part; in Trees & Shrubs, II. 262 (1913).

Aesculus arguta Mackenzie & Bush, Man. Fl. Jackson Co., Mo., 128 (1902).—Daniels, Fl. Columbia, Mo., 173 (1907).—Not Buckley.

As Sargent's *A. glabra* var. *Buckleyi* is based primarily on *A. arguta* Buckley, it becomes a synonym of *A. arguta* Buckley or of *A. glabra* var. *arguta* Robinson if *A. arguta* is considered a variety of *A. glabra* Willd. The existence of the name *Aesculus Pavia* var. *arguta* Lindl. which was the reason for changing Robinson's varietal name to '*Buckleyi*,'' does not under our present rules of nomenclature invalidate a varietal name under another species. This leaves the variety of *A. glabra* as defined in Trees & Shrubs, II. 262 without a valid name and I propose for it the name given above.

× **Aesculus mutabilis** var. **Harbisonii**, var. nov.

× *Aesculus Harbisonii* Sargent, Trees & Shrubs, II. 259 (1913).

As *Aesculus Harbisonii* Sarg. (*A. georgiana* × *discolor* var. *mollis*) and *A. mutabilis* Schelle (*A. discolor mollis* × *neglecta georgiana* Sargent in Jour. Arnold Arb. v. 47 [1924]) are hybrids between the same species, they should be classed under the same binomial, and *A. mutabilis* Schelle (in Beissner, Schelle and Zabel, Handb. Laubholz-Ben. 323 (1903).—*Pavia*

mutabilis Spach in Ann. Sci. Nat. sér. 2, II. 57 [1834]) being the oldest name, *A. Harbisonii* should be referred to it as a synonym or a variety. On account of the differences between the two forms, typical *A. mutabilis* having red and yellow flowers and the leaves villous and pale green beneath while *A. Harbisonii* has bright red flowers and the leaves only slightly pubescent at first, soon nearly glabrous and glaucescent beneath, it seems best to consider the latter a variety of *A. mutabilis*.

Stewartia koreana Nakai in sched., spec. nov.

Arbor 5–15 m. alta, ramulis glabris leviter angulato-flexuosis et robustioribus saltem plus minusve compressis; gemmae pubescentes. Folia late elliptica vel elliptica vel ovato-elliptica, 6–11 cm. longa et 3–7 cm. lata, acuminata, basi late cuneata vel interdum rotundata, serrulata dentibus interdum valde reductis vel distinctius serratis dentibus porrectis, utrinque laxe piloso-villosis, supra maturitate saepe glabrata, subtus pilis satis longis persistentibus ad costam nervosque densius in facie sparsius vestita; petioli 0.5–1.5, rarius 2 cm. longi, pilosi vel glabrati. Pedicelli fructiferi graciles, 1–2.5 cm. longi, glabrati, axillares vel terminales; bracteae delapsae; sepala ovata extus dense sericea, intus glabra: capsula ovoidea, rostrata, circiter 2 cm. alta, sericea. Flores non visi.

KOREA: Prov. S. Keisho, foot of Mt. Kirishan, common in woods, alt. 600–1845 m., *E. H. Wilson*, no. 9596, November 14, 1917 (type). Also specimens coll. September 21, 1922 and November 2, 1926, of plants raised from seed of no. 9596.

This new species is most closely related to *S. pseudocamellia* Maxim. which however, differs in the narrower leaves with a tendency to become obovate, with an almost obsolete serration, more narrowly cuneate at base, appressed silky-pubescent beneath, glabrous or nearly so at maturity, glabrous and somewhat lustrous above and thickish at maturity, and in the suborbicular rounded sepals. The flower of *S. koreana*, when known, will no doubt show further distinguishing characters. The plants as they grow in this Arboretum look quite distinct particularly in autumn, when the leaves of *S. pseudocamellia* assume a very dark purple-crimson color on their somewhat lustrous smooth upper surface and a purplish hue beneath, while those of *S. koreana* show a bright brownish orange or orange-red color on their dull and rather rugose upper side and a brownish or greenish yellow color beneath; moreover the leaves of the latter species are of rather membranous texture, while those of *S. pseudocamellia* are thickish and almost fleshy; also the decidedly zigazg branchlets of which the more vigorous ones are compressed in the plane of the distichous leaves are a peculiar feature of *S. koreana*. The most distinctive character, however, between the two species seems to be the character of the pubescence which consists of closely appressed silky hairs in *S. pseudo-camellia* and of pilose more or less spreading hairs in *S. koreana*.

Acanthopanax Sieboldianus Mak. f. **variegatus,** comb. nov.

Acanthopanax pentaphyllum var. *variegatum* Hort. apud Rehder in Bailey, Cycl. Am.-Hort. I. 11 (1900).—Bean, Trees & Shrubs Brit. Isles, I. 131 (1914).
Eleutherococcus japonicus f. *variegatus* Nakai in Jour. Arnold Arb. v. 11 (1924).

When Dr. Nakai took up *Acanthopanax japonicum* Franch. & Sav. as the oldest name for the plant usually called *A. pentaphyllus* March. he had not yet seen Franchet & Savatier's type and from the description identified it with *A. pentaphyllus* March., but during his visit to the Natural History Museum of Paris he informed me in his letter of December 10, 1924, that Franchet's *A. japonicum* is identical with *A. commixtum* Nakai; the latter name, therefore, will become a synonym of *A. japonicus* Franch. & Sav. Marchal based his *A. pentaphyllus* on *Aralia pentaphylla* Sieb. & Zucc. which is a non-valid name being an erroneous identification of *A. pentaphylla* Thunb.; Marchal's combination, therefore, cannot be considered valid and his name must be replaced by the next oldest valid name which is *A. Sieboldianus* Makino.

Aralia elata f. **fastigiata,** comb. nov.

Aralia chinensis var. *fastigiata* Anon. in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. L. 64, no. 44378 (1922).

Of this form a living plant was received from the U. S. Department of Agriculture under no. 44378 who obtained it in 1917 from Hon. Vicary Gibbs, Aldenham House, Elstree, Herts, England, as *A. chinensis fastigiata* It does, however, not belong to true *A. chinensis* L. differing in the elongated main axis from *A. elata* Seem which has a short main axis and large spreading subumbellate secondary axes, but to the latter, as flowering and fruiting specimens received from the Field Station of the Department of Agriculture at Bell, Maryland, clearly show. The form differs from the type in the erect or ascending branches, in the less spreading or more or less upright shorter leaves with crowded and overlapping pinnae and leaflets which are somewhat smaller and pubescent on the veins beneath at least when young.

Cornus florida L. f. **pluribracteata,** f. nov.

"Lindley's New Double Flowering Dogwood," Thos. C. Hunt, 4 pp. 2 ill. Boston (about 1915?).

A typo recedit inflorescentia bracteis 6-8 majoribus et pluribus minoribus instructa, capitulo florum toto vel plus minusve abortivo.

CULTIVATED: Greensboro, North Carolina, *J. Van Lindley*, 1915 (type).

In this form the usual number of four bracts in the typical species is increased to 6-8 and besides there are several smaller bracts in the centre replacing the flowerhead which is nearly or entirely aborted. The bracts are rather large measuring up to nearly 6 cm. in length, and to 4 cm. in width. This form was discovered in Orange County, North Carolina, and propagated by Mr. J. Van Lindley, Greensboro, North Carolina, who sent in 1914 a plant to the Arnold Arboretum which, however, has not yet flowered. This year we received specimens of another *Cornus florida* with

an increased number of bracts but the number of additional bracts is only 1–3 and the head of flowers is normal; this form was collected March 29, 1926, by Mr. Edward Teas in Montgomery County, Texas.

Rhododendron arborescens Pursh f. **flavescens**, f. nov.

A typo recedit corolla pallide flavida, lobo superiore magis colorato et maculis duobus intensius luteis notato.

CULTIVATED: Hort. H. H. Richardson, Brookline, Mass., *A. Rehder*, July 2, 1926 (type); Arnold Arboretum, no. 16130 (plant received in 1922 from Cherry Hill nursery), *E. H. Wilson*, July, 1923.

This form with its pale yellow flowers represents a rather striking variation from the typical form with pure white flowers, but traces of yellow color can be found even in plants of otherwise typical *R. arborescens* which may show two faint yellow blotches sometimes fainter sometimes more distinct at the base of the upper lobe; such plants are found scattered among the numerous shrubs of the species planted in this Arboretum.

The corolla of the plant from Mr. Richardson's garden which was introduced from North Carolina is fairly large, measuring 4.5–5 cm. in diameter, while the other plant from the Cherry Hill Nursery has a smaller corolla with the tube, sepals and pedicels more densely glandular.

Rhododendron arborescens Pursh f. **rubescens**, f. nov.

A typo recedit corolla et praesertim limbo ad marginem laborum purpureo-roseo, corolla plerumque paullo minore, lobis angustioribus, lobo superiore maculis duobus luteis notato.

CULTIVATED: Hort. H. H. Richardson, *A. Rehder*, July 2, 1926.

This form is a counterpart of *R. viscosum* f. *rubescens* Rehd. and differs from the typical white-flowered form in the more or less purple-pink limb of the corolla with the upper lobe marked at their base with two yellow blotches. The corolla is usually smaller than in typical *R. arborescens*, in the specimen cited above 3–3.5 cm. across, the upper lobe 8 mm. wide, the others narrower.

Epigaea repens L. f. **plena**, f. nov.

A typo recedit floribus plenis, i.e. staminibus in staminodia petaloidea mutatis.

MASSACHUSETTS: Granby, Hampshire County, *Elbert C. Aldrich*, May 12, 1926.

This interesting addition to double-flowered forms of Ericaceae was found growing wild near Granby by Mr. Elbert C. Aldrich. As far as I know no double-flowered form of Epigaea has been as yet recorded. In the flower of this form the stamens are all more or less petaloid, partly rather broad and adnate to the corolla or connate at base and partly filiform, but all without anthers. The pistil is normal.

(*To be continued*)

NOTES

The Arnold Arboretum Expedition to North Central Asia.—During the two years Mr. J. F. Rock has been engaged in exploring the flora of north central China for the Arboretum he has visited the high, nearly barren Richthofen Range in Kansu, the Kokonor region, the high and barren Amne Machin Range, the valley of the Yellow River and its heavily wooded ravines in Tibet. He made last year a partial exploration of the Tebbu country in southwestern Kansu, and during the late summer and early autumn of 1926 he extended his exploration of this region of which he wrote as follows on September 9th from the Wantsanggomba Monastery, Lower Tebbu country.

"I have never in all my life seen such magnificent scenery. If the writer of Genesis had seen the Tebbu country he would have made it the birthplace of Adam and Eve, for besides an endless variety of Conifers there are even Apple trees 40–60 feet tall but the apples are not the kind that would have tempted Eve. I am sorry to report, however, that the Conifers are on an off year this season, they are not fruiting. There is an incredible variety of Conifers the like I have never seen. We located three species which we had as yet not collected, which have this year's cones and seeds shall be collected of these species to be added to the Arnold Arboretum Conifers. Between the upper and lower Tebbu there are magnificent forests of Conifers some of which we have never seen before, and I am glad to report that they are all loaded with fruit. Unfortunately one has to pass a gorge called Tsaraku which leads to the grass country and a monastery of thieves called Datso Lhoma; the place and the gorge has an evil reputation. When we passed it there were Tibetans hiding in the bushes with their rifles and had they cared they could have made an end of the Arnold Arboretum expedition. The gorge is outside of the Choni prince's domain and is in no man's land; it leads to the uncontrolled grass country. People few in numbers are usually attacked here. There is one consolation, no Chinese "Patriots" will dare venture to this beauty spot for they do not care about scenery or forest, their only object is to plunder and should they chance to come over they would find themselves not the plunderers but the plundered, and I doubt if their hide would remain on their patriotic frames. To be more serious, I may state that I might be able to predict a good "end-all" in the shape of many parcels of seeds and many specimens of both plants and birds."

On September 14th he wrote,—

"In continuation of my letter of September 9th from this place I will just add a few lines, saying that I made a tour of the Wantsang valley to 10,000 feet elevation. The forests are perfectly wonderful. At 8500 feet we came across a species of Populus; it is certainly one of the finest Poplars I have ever seen. It is associated with Picea, Abies, Acer, Sorbus and Betula. This Poplar rivals the Spruces and Abies, the Spruces and one species of Abies reaching a height of from 100–150 feet. These Poplar trees grow scattered among the conifers, and have straight poles 4 feet in diameter, clothed in a drab to grayish brown bark deeply corrugated, but have for 50–60 feet from their base not a single branch; they then spread into a huge crown with large leaves dark green above and grayish green pubescent beneath; from a distance the leaves appear white. It is however, not that species with tomentose white leaves which we observed near Kouchow. I am sending you cuttings of this wonderful tree whose wood is much valued by the Tebbus but is not planted by them. On the banks of the Peshwekiang in the rocky gorges at 6500 feet elevation near the Wantsang monastery grows another Poplar in shape of the Lombardy Poplar. Of this I am sending you also cuttings. It does not occur in Choni or on the other side of the Minshan."

In a letter from Mr. Rock from Choni, Kansu, dated September 24th, he writes,—

"In the Tebbu country we found various Hydrangeas, Viburnums, many Acer, some huge trees, huge Quercus, enormous Malus, Sorbus, even Meliosma, a few Koelreuteria with large compound leaves, a species of Padus, a tree 60 feet tall with trunks 2 feet in diameter, glabrous glaucous leaves; this species I have only observed in the dense Abies and Spruce forests to 9500 feet elevation; the racemes bearing orange to brown small cherries are about a foot or more long. It must be a handsome tree when in flower. Acanthopanax, a lovely species with long drooping peduncles bearing large umbels of black fruit, the whole inflorescence being over a foot long in some individuals. There are large panicle-bearing Aralias, beautiful Syringas in the drier regions, large Ailanthus trees with huge clusters of red fruits, several interesting Cornus, Ribes, Deutzia, Philadelphus, Caragana, Betula we observed four distinct species, Tilia, Cotoneaster, Juniper, Evonymus, Prunus, Lonicera, among them a tree 15–20 feet tall, with shaggy papery bark of a pale flesh color, Jasmine, Crataegus, not the *C. pinnatifida*, Xanthoxylum, Rhododendron different from what we sent before, Populus, Salix, Rosa, Rubus, Berberis and last but not least the Abies and Picea."

Since the receipt of these letters fifty-two packages of seeds and two packages of Poplar cuttings collected in the Tebbu region have reached the Arboretum in good condition.—C. S. S.

Accessions to the Library during the year ended June 30, 1926.— During the fifty-three years of its existence while the Arboretum has been growing in size and usefulness and has come to be known in every quarter of the globe, side by side with the growth of its collections of living plants and its Herbarium has gone on quietly and modestly, but none the less surely, that of its Library. Unlike the other two departments the wealth of the Library has until recent years been comparatively little known. Begun with a strictly utilitarian purpose as a small reference library to supply the needs of botanical study in building up the Arboretum, an interest was soon aroused in the bibliographical aspect of the undertaking, and the collecting of rare works and of as many editions as possible of important works went rapidly on together with the acquisition of all books necessary to a well-balanced collection of works dealing with woody plants. Books of travel bearing on countries visited by the Arboretum's expeditions or containing mention of plants have also been included. The Library has gradually increased in size until at the end of the college fiscal year, it comprised 36,566 bound volumes, 8,372 pamphlets, and 100 or more works coming out in parts. Of these, 500 volumes and 202 pamphlets were added during the year. Among the books added some are deserving of special mention:

DAS PUCH DER NATUR, by Conrad von Megenburg, printed at Augsburg, by Johann Bämler, in October, 1475.—First edition, extremely rare.
The gift of Mr. J. Pierpont Morgan, the only other copy in the United States being in Mr. Morgan's own library. A second edition of this work and the only copy known to be in the United States was presented to the Arboretum by Mrs. J. M. Sears in 1924.

LE GRANT HERBIER. Alain Lotrain, Paris. [cir. 1530].—Extremely rare and fine example of an early French herbal.
Gift of Mrs. J. M. Sears.

Josselyn, John. New England's rarities discovered. London, printed for G. Widdowes. 1672. Very rare first edition.—Josselyn first visited New England in 1638, landing at Boston on July 2nd. The chronological table ranges from 1492 to 1672, and the work contains a very interesting description of the flora and fauna of New England.
Gift of Mrs. J. M. Sears.

Brunschwig, Hieronymus. Liber de arte distillandi de compositis. [Strassburg, Joh. Grüninger. 1512.]

Scotland's trees. Vol. i.—An important collection of photographs of many of the most remarkable trees of Scotland, from the library of the late Collingwood Lindsay Wood of Freeland, Forgandenny, Scotland.

Strutt, J. G. Deliciae sylvarum; or, Grand and romantic forest scenery in England and Scotland.—A collection of 77 proofs in various states of the engraved title, 12 published and 7 unpublished plates. [1828–33.]

[Lecoq, H. Statistique végétal des environs d'Avesnes.] An unpublished MS. about 1850, containing well-executed coloured diagrams and figures. Dr. Bonnet gives an interesting account of this MS. in *Assoc. française pour l'avancement des sciences. Congrès de Lille*, 1909.

[Mérat de Vaumartoise, F. V. Herborisations dans les environs de Paris.]—An unpublished MS., about 1830, written on 180 pages. The fly-leave reads: "Ce manuscrit est entier de la main de F. V. Mérat."

Lippi, Augustin. Description des plantes observées en Ægypte, 1704. Copy of the unpublished MS.

Description of different varieties of the rose. 1851. G. A. N.—Original MS. neatly written on 263 leaves, with pen and ink sketches of methods of grafting, pruning, etc.

Kyber, David. Lexicon rei herbariae trilingue. 1553.—Very fine, well preserved original German binding, wooden boards, covered with richly stamped vellum. Rare first edition, name of contemporary owner on first leaf.
Gift of Mrs. J. M. Sears.

Evelyn, John. Kalendarium hortense. 6th ed. London. 1676.

Estienne, Charles. De re hortensi libellus. 1542.

Chabraeus, Dominicus. Stirpium icones et sciagraphia. 1666.—First edition.

Matthiolus, P. A. Commentarii secundo aucti. 1559.—With the same series of woodcuts as in the 1554 edition, and several others. Vellum, initialed T H M D and dated 1631.

Macer, Aemilius. [De virtutibus herbarum.] Hrebarum [*sic*] vires, Macer tibi carmine dicet. [cir. 1525.]
Gift of Mrs. J. M. Sears.

Bassaeus, Nicolaus. Eicones plantarum. 1590.—A re-issue of the woodcuts in J. Theodorus Tabernæmontanus, Neuw kreuterbuch. The same woodcuts were used in Gerarde's Herbal. 1597.
Gift of Mrs. J. M. Sears.

WORLIDGE, John. Systema horti-culturae. 3d ed. 1688.

Three hundred and fifty periodical publications are currently received by the library, eighteen having been added during 1925-26. The Journal of the Arnold Arboretum as a medium of exchange brings an interesting number from gardens and institutions in nearly every country of the world. Among the most recent are:

Acta Instituti et Horti botanici tartuensis.
Acta Horti botanici Universitatis latviensis.
Meddelanden från Göteborgs Botaniska trädgård.
Acta botanica Instituti botanici R. Universitatis zagrebensis.

A unique department of the library and one that is receiving much attention is its collection of photographs, now numbering 12,515, of which 632 have been added during the year, including 200 received from Mr. Rock, the Arboretum's emissary to China.

In 1919 the Arboretum possessed 1500 mounted but unarranged and unavailable photographs gathered at random, many of them useless. At that time it was decided to build up a systematic collection including photographs of trees, botanic gardens, views, and portraits of men distinguished in botany, horticulture and landscape gardening, and to have them fully catalogued, classified, and so placed as to be immediately available. This was done, steel cases procured for containing them, and in seven years the numbers have far surpassed expectations. The first addition was that of 2100 photographs taken by Mr. E. H. Wilson during many years spent in exploration for the Arboretum in China and Japan, then followed 1500 taken by Mr. Frank N. Meyer in the same countries.

Many photographs have come to us by gift. The Park department in Rochester has shown a most helpful interest and has added very largely to the numbers and value of the collection. The rapidity with which it has grown and the demands constantly made upon it fully attest to the fact that it has filled a real need. It is the aim to have a photograph of living specimens of every genus and every species of woody plants so far as possible.

Through members of the staff who are attempting to procure pictures of all the notable trees throughout New England and also of trees through the middle West and the southern states it is gaining constantly in the possession of photographs not only of beauty and of very practical use but also as records of trees which in a few years may no longer be standing.

During the past year an especial effort has been made to strengthen the group of portraits which was in the nature of the case very small. The responses to requests have been encouraging and these with other gifts and a few purchases have made an appreciable increase.—E. M. T.

Accessions to the Herbarium during the year ended June 30, 1926.—The herbarium is intended to contain a representation of the woody plants of the world, but though a good beginning has been made during the 48

years of its existence, there are still some important regions, like Madagascar and some of the South Sea Islands which are poorly represented. The regions best represented are those of North America and of eastern Asia. Special attention has been paid to the Conifers of which all genera and almost all species are represented while with the Palms and some other families only a comparatively small beginning has been made. Much attention is also being paid to cultivated trees and shrubs and the aim is to have the trees and shrubs in cultivation including the garden forms represented in the herbarium from cultivated plants to form a record of their introduction and cultivation.

At the end of June, 1926, the herbarium contained 276,804 specimens of which 21,783 were added during the year from July 1, 1925 to June 30, 1926, the largest addition in any one year. The herbarium also contains a large number of fruit specimens which have not been counted. Among the accessions of last year were about 2,800 specimens from North America, 300 from South America, 1,100 from Europe and W. Asia, 5,000 from China, 500 from the Himalayas and 1900 from the Philippine Islands including a number of plants from Borneo and Sumatra, 400 from New Caledonia and 4,000 specimens of cultivated trees and shrubs. The largest single collection was one of 4,300 specimens mostly of cultivated plants but including a number of plants from southeastern Europe, which formed part of the private herbarium of C. Schneider, the other part having been incorporated in this herbarium before, and one of 2300 specimens from southwestern China and Indo-China collected by J. F. Rock and presented by the U. S. National Herbarium. Other noteworthy collections are one of 750 specimens made in Anwhei, a province of China hitherto botanically almost unknown, by R. C. Ching of the National Southeastern University of Nanking, and one of 400 specimens made by C. T. White of Brisbane and partly by I. Franc of Nouméa in New Caledonia.

During the year 1925–26 there have been distributed 8600 duplicates, mostly in exchange, to 26 institutions in this country, Europe, Asia, Africa and Australia.—A. R.

Taxodium and Glyptostrobus.—These two genera belonging to a group of ancient and isolated types in the family have alsway attracted the attention of the student of Coniferae and therefore the critical account presented by Dr. A. Henry and Mrs. Marion McIntyre[1] will be of special interest to the botanists interested in Conifers and also to the palaeontologist. The paper begins with a detailed account of *Glyptostrobus pensilis* K. Koch which at present is found only in two localities in southwestern China, though in earlier periods the genus was widely distributed over the whole northern Hemisphere. The peculiar 'knees" similar to those of

[1] Henry, Augustine & Marion McIntyre. The Swamp Cypresses, Glyptostrobus of China and Taxodium of America with notes on allied genera. (Proc. Roy. Irish Acad. xxxvii. b, 90–116, 8 pl. (1926).—Reprint: Hodges, Figgis & Co., Dublin. Price 1 s. 6 d.

Taxodium are described and figured and the morphological and anatomical characters of the species are described in detail and illustrated. The fossil remains in the Cretaceous and Tertiary strata are discussed and localities are given, but it is stated that the Cretaceous material is devoid of cones and therefore doubtful. Of Taxodium the authors distinguish three species, *Taxodium distichum* Rich., *T. ascendens* Brong. and *T. mucronatum* Ten., though they consider *T. ascendens* a sport of *Taxodium distichum*, a view not shared by the majority of American botanists who had the opportunity to observe the two species in their native habitat. The morphology and anatomy of Taxodium is dealt with in great detail. The structure of wood is compared with that of Glyptostrobus, Sequoia and Wellingtonia. The latter genus is here maintained on account of differences in foliage, cones and wood. The six plates show the habit of *Glyptostrobus pensilis*, the "knees" of this species, shoots of Glyptostrobus and Taxodium with morphological and anatomical details of leaves, flowers and cones and the structure of the wood of the two genera and of Sequoia and Wellingtonia. Besides the comparative study of the wood of these four genera the detailed account of *Glyptostrobus pensilis* is perhaps the most valuable part of the paper, as this species has been hitherto little and incompletely known. It is very rare in cultivation being grown only in a few British gardens under glass or only in favorable localities outdoors; it probably does not exist at all in American gardens.—A. R.

ERRATA

Page 5, line 15 from below *for* Arkansas *read* Van Buren.
" 6, line 20 for **Carya floridana** read **Carya Buckleyi.**
" " line 13 from below for **Betula lenta** read **Betula lutea.**
" " line 12 from below *for* 206 *read* 207.
" 8, line 22 for **Q. obtusata** read **Q. obtusa.**
" 11, between line 6 and 7 insert: **Platanus occidentalis.**
" " between line 15 and 16 insert: **Crataegus crus-galli.**
" 17, line 7 from below for **Creus** read **Cereus.**
" 29, between lines 1 and 2 under **Stranvaesia Davidiana var. salicifolia** insert:

Photinia niitakayamensis Hayata in Jour. Coll. Sci. Tokyo, XXX. art. I. 103 (1911).
Stranvaesia niitakayamensis Kanehira, Formos. Trees, ed. 2, 216 (1918).

" " between lines 6 and 7 insert:

FORMOSA. Prov. Kagi: Arisan, alt. 2500-2830 m., *E. H. Wilson*, no. 9724, January, 29, 1918.

" 93, line, 19 for **Pteripterygia** read **Peripterygia.**
" 95, line, 8 FOR *E. polychistus* Schltr. in herb. READ *E. polyschistus* Schltr.
" 100, line 8 from below for *Durkeimiana* read *Duerckheimiana.*
" 105, line 2 from below *for* de Soto *read* De Soto.
" 114, line 8 for *A. cistifolium* read *H. cistifolium.*
" 116, line 15 from below *for* Foug. *read* Cast.
" 121, line 15 for *Carrica* read *Carica.*
" 125, line 8 from below *for* brevioribus *read* latioribus.
" 136, line 9 from below *for* growth *read* growths.
" 163, line 13 from below *for* tschouan *read* tchouan.
" 173, line 13 from below for *Lowderwielk* read *Lowdermilk.*
" 214, line 21 for *C. orbiculata* read *C. articulata.*

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Juniperus procera Hochstetter

Tree 110 feet tall, 21 feet in girth, near Lari, Kenya Colony

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JUNIPERUS PROCERA HOCHST.

ERNEST H. WILSON

Plate 4

THE East African Cedar (*Juniperus procera* Hochst.) is the giant of the genus, being sometimes 150 feet tall with a trunk 30 feet in girth. It is distributed from the mountains of Abyssinia southward over the highlands and mountains of Kenya southeast to the Kilimanjaro range in Tanganyika. Its western limits appear to be Mt. Elgon in northeastern Uganda. The altitudinal range of the Juniper is from 5000 to 10,000 feet above sea-level, but its greatest perfection and abundance is between elevations of from 7000 to 9000 feet. Within its altitudinal range distribution is governed very largely by rainfall. It is most luxuriant where the rainfall averages from 40 to 55 inches per year. In this belt it forms magnificent forests, either pure or mixed with a miscellany of hard-wood trees. It is found in a more or less stunted condition in savannah areas where the annual rainfall is as low as 25 inches. Where the yearly precipitation exceeds 55 inches this Juniper gives place to more moisture-loving broad-leafed evergreen trees and is entirely absent.

In Kenya, beyond Nairobe, on the uplands at Lari westward to Kinobop and elsewhere round the base of the Aberdare mountains, the tree is most abundant and in greatest perfection. The avĕrage height is from 80 to 120 feet with a trunk from 15 to 18 feet in girth. Under most favorable conditions the bole is often free of branches for a length of from 50 to 60 feet. Occasionally it forms pure forests but more usually it is mixed with *Podocarpus gracilior* Pilger, *Olea chrysophylla* Lam., *O. Hochstetteri* Baker, *Nuxia congesta* R. Br., and certain other broad-leafed trees.

In its youth the African Cedar is pyramidal in outline with lance-shaped leaves after the manner of its relatives, the Red Cedar (*Juniperus virginiana* L.) and the Chinese Juniper (*J. chinensis* L.). At maturity it has a wide-spreading, round-topped crown from 50 to 60 feet through, made up of thick branches clothed with light green foliage. The bole is erect and massive and is clothed with thin, gray or gray-brown bark, fibrous and stringy in texture. The tree is dioecious and produces

flowers very abundantly. The 2- to 3-seeded fruit is about the size of a garden pea, blue-black in color. The leaves on the adult tree are all small and scale-like.

Like its American relative, the East African Cedar is a lover of open country, and, except in its youth, a light-demanding tree. In the semi-dry savannah regions it occurs as a scattered tree, seldom more than 60 feet tall, with a short, very thick trunk and an abnormally wide-spreading crown. Where it forms pure forests it is lofty with a small crown and a less massive trunk.

Under pure forest conditions the seeds of the Juniper do not vegetate except on the outskirts or in glades. Among mixed trees but more especially in the open grass-clad areas and where shrubs grow the seeds vegetate freely. Its natural nurse appears to be *Hypericum lanceolatum* Lam. which is a very common bush or small tree with handsome red-brown bark and large clear yellow flowers.

All in all this Juniper is the most valuable timber tree of the highland forests of eastern Africa. The wood varies in color from pale to rich cedar-brown and is very fragrant. It is not attacked by termites, is exceedingly durable in the ground, and is excellent for panelling, for window sashes, for shingles, for pillars, etc. It is difficult to nail since it cracks and splits readily. Although somewhat harder than that of *Juniperus virginiana* L. the wood is well-suited for making writing pencils. Unfortunately most of the trees, in Kenya at least, are over-mature, and the timber exceedingly faulty from ingrowing bark and from fungus attacks, moreover, many of the trees are badly infested with a species of Mistletoe. The Forestry Officers of Kenya, appreciating the great value of this tree, are now placing it under safe control. The over-mature trees are being removed and proper silvicultural methods applied to the forests. Also, it is being raised in immense quantities from seeds, new plantations are rapidly being made and the future of this most useful timber tree is now assured.

It appears to have been discovered by Wilhelm Schimper, sometimes before 1844, near the church Adda Mariam at Enschedeap, near Tchetatchekamme, in the region of Chohoo, and at Quodgerate Listchedeap, and Semen in Abyssinia. At what date it was introduced into cultivation I have not been able to ascertain but there is a specimen in this herbarium from a plant cultivated in the grounds of the Southern Californian Acclimatizing Association, Santa Barbara in 1898. In 1921, I paid a special visit to Kenya for the purpose of studying and photographing this tree, and sent home a quantity of seeds which were widely distributed by the Arnold Arboretum.

NEW CHINESE LIGNEOUS PLANTS

E. D. Merrill

In this paper twenty-one presumably new species of Chinese woody plants are described and two genera new to China recorded from material that has recently been submitted to me for study. Most of the species considered are from Kwangtung Province being represented in the collections made under the auspices of Dr. F. R. Wulsin, representing the National Geographic Society, who coöperated with the Canton Christian College (now Ling Nan University) in a rather extensive exploration of the North River region in Kwangtung Province in 1924. The actual field work was done by three Chinese collectors employed by the latter institution, Messrs. To Kang Peng, Ts'ang Wai Tak, and Ts'ang Un Kin. Other species considered are largely based on material submitted to me for identification by A. N. Steward, of the University of Nanking, with a few from other sources. The study set of these collections is deposited in the Herbarium of the University of California, but the actual types of those species based on the Wulsin Expedition collection are in the United States National Herbarium.

The Wulsin Expedition Kwangtung collections comprise approximately 1000 numbers, the collections being divided between the Canton Christian College and the United States National Herbarium, half the duplicates of each number being retained in Canton, and half forwarded to me in Berkeley, which, after identification were transmitted to the United States National Herbarium, except for one set that was retained in Berkeley. The collection is rather important because, in addition to the sixteen species herein described as new, it added about twenty genera and fifty species, previously described by various authors, to the list of those known from Kwangtung Province. A paper recording the previously described genera and species new to the Kwangtung flora has recently been submitted to F. A. McClure for publication in the Lingnaam Agricultural Review.

MORACEAE

Ficus Linnaeus

Ficus kwangtungensis, sp. nov. (§Eusyce).

Frutex erectus, multiramosus, ramulis junioribus fructibusque exceptis glaber, ramis teretibus, glabris, rubro-brunneis, ramulis tenuibus, elongatis, 1–1.5 mm. diametro, novellis adpresse pubescentibus: foliis lanceolatis ad oblongo-lanceolatis, 3–6.5 cm. longis, 1–2 cm. latis, integris, subcoriaceis, pallide olivaceis vel olivaceo-viridibus, utrinque subconcoloribus, laevibus, basi obtusis ad acutis, apice perspicue subcaudato-acuminatis, subtus minute crebreque foveolatis, nervis primariis utrinque circiter 10, subtus distinctis, paullo elevatis, arcuato-anastomosantibus; petiolo 4–5 mm. longo, pubescenti; stipulis lanceolatis, acu-

minatis, circiter 3 mm. longis, deciduis, parce pubescentibus; receptaculis axillaribus, solitariis, breviter pedunculatis, globosis, 5–6 mm. diametro, disperse adpresseque hirsutis, laevibus; pedunculis 1.5–2 mm. longis, leviter pubescentibus; bracteis 3, triangulari-ovatis, acuminatis, circiter 1 mm. longis, adpresse pubescentibus; floribus masculis perianthii segmentis 3, rubro-brunneis, oblongo-ellipticis, plus minusve cucullatis, obtusis, 1 mm. longis, antheris 2, anguste oblongis, 0.8 mm. longis; floribus femineis haud visis, galliferis numerosis, segmentis oblongis ad oblongo-lanceolatis, rubro-brunneis, curvatis, glabris, circiter 1.5 mm. longis.

KWANGTUNG PROVINCE: near Fung Wan, North River region, July 14, 1924, Canton Christian College no. 12832 (Wulsin Expedition). — A shrub in rocky places; local name "ngau nai t'ung."

I have not been able to refer this distinctly characteristic species to any hitherto described form. It is well characterized by its small, lanceolate, conspicuously acuminate, glabrous leaves which are minutely and densely foveolate on the lower surface, in the latter character approaching some forms placed in the group with *Ficus foveolata* Wall.; as well as by its small globose, shortly pedunculed, smooth, sparingly appressed-hirsute receptacles. In habit, which is strictly erect, it is remote from Wallich's species and the others generally placed in this alliance, yet I believe that its true alliance is with this group.

LORANTHACEAE

Loranthus Linnaeus

Loranthus kwangtungensis, sp. nov.

Frutex parasiticus, partibus junioribus inflorescentiisque parce pubescentibus exceptis glaber, ramis ramulisque teretibus, ramis glaberrimis, parce lenticellatis, ramulis circiter 1.5 mm. diametro, parce brevissime pubescentibus glabrescentibus; foliis crasse coriaceis, fragilibus, oblongo-ellipticis ad anguste obovatis, apice rotundatis, basi acutis, utrinque glabris, in sicco verruculosis, olivaceis vel flavido-brunneis, subtus paullo pallidioribus, 6–8 cm. longis, 2.5–4 cm. latis, costa utrinque distincta, nervis lateralibus venulisque obsoletis; petiolo 6–9 mm. longo; inflorescentiis axillaribus, solitariis, racemosis, paucifloris, vix 1 cm. longis, subferrugineo-pubescentibus; floribus 2–5, rubris vel deorsum flavidis, 4-meris, 3–3.2 cm. longis, curvatis, parcissime pubescentibus; pedicellis circiter 4 mm. longis; calycibus cylindraceis, leviter pubescentibus, rugosis, circiter 3 mm. longis, 2 mm. diametro, limbo vix producto, truncato; corollae tubo circiter 1.6 cm. longo, deorsum leviter inflato, lobis (partibus reflexis) anguste oblongis, obtusis, circiter 6 mm. longis, 1.5 mm. latis; filamentis glabris, 2 mm. longis, antheris continuis, 3.5 mm. longis.

KWANGTUNG PROVINCE: Chaa Uen Shan and Tung Tsz Haang, Wai Chung Peng, Lung T'au Mountain, North River region. *F. A.*

McClure, nos. 13788, 13755 (type), January, 1926. Parasitic on magnoliaceous and other trees in forested ravines, flowers red or red with a yellow base.

This differs essentially from *Loranthus yadoriki* Sieb. & Zucc., from which *Loranthus Levinei* Merr. is doubtfully distinct, in its leaves being entirely glabrous on both surfaces and in its nearly glabrous flowers. *Loranthus nigrans* Hance, judging from the description, differs in its dense indumentum; the latter species is apparently very close to *L. yadoriki* Sieb. & Zucc.

MAGNOLIACEAE

Magnolia Linnaeus

Magnolia kwangtungensis, sp. nov.

Arbor 5–12 m. alta, ramis glabris, cicatricibus perspicuis instructis, ramulis circiter 5 mm. diametro, partibus junioribus densissime fulvo- ad cupreo-villosis: foliis coriaceis, ut videtur haud deciduis, oblongis ad oblongo-ellipticis, 15–20 cm. longis, 5–7 cm. latis, apice obtusis ad perspicue obtuseque acuminatis, basi acutis ad cuneatis, supra glaberrimis, nitidis, in sicco pallidis ad pallide viridibus, subtus plerumque brunneis, disperse fulvo- ad cupreo-villosis, costa subtus elevata, valde perspicua, subdense villosa, nervis lateralibus utrinque circiter 12, tenuibus, haud perspicuis, arcuato-anastomosantibus, reticulo venularum laxo; petiolo densissime fulvo- ad cupreo-villoso, 2–3 cm. longo; floribus terminalibus, albidis, erectis, solitariis, saltem 4 cm. longis, pedunculo 3–7 cm. longo, densissime villoso; sepalis petalisque saltem 9, coriaceis, glabris, oblongo-ellipticis ad oblongo-obovatis, circiter 4 cm. longis, 2 cm. latis, verruculosis; antheris numerosissimis, circiter 1.2 cm. longis, curvatis; carpellis confertis, numerosis, glabris, circiter 8 mm. longis, irregulariter oblanceolatis, apice acuminatis.

Kwangtung Province: Lung T'au Mountain, near Iu, North River region, May and June, 1924, Canton Christian College nos. 12179, 12344 (type), 12548 (Wulsin Expedition). A tree in forested ravines.

The first number cited bears the native name "mo t'o," the second "shan p'i p'a," and the third two field labels with two different names, one "mo t'o," the other "mo kau un"; both of these labels bear the further statement: "heung koo tree."

The species is, I believe, closely allied to *Magnolia Fordiana* Hu (*Manglietia Fordiana* Oliver), from which it is at once distinguished by its fulvous to cupreous indumentum.

LAURACEAE

Phoebe Nees

Phoebe acuminata, sp. nov.

Arbor circiter 10 m. alta, ramis ramulisque glabris vel ramulis parcissime villosis, in sicco subpurpureis ad rubro-purpureis, laevibus, tereti-

bus, ramulis circiter 2 mm. diametro; foliis lanceolatis, coriaceis vel subcoriaceis, in sicco pallidis, supra glaberrimis, nitidis, subtus pallide ferrugineis, disperse pallide villosis praesertim ad costam nervosque, 6–12 cm. longis, 2–2.7 cm. latis, utrinque subaequaliter angustatis, basi cuneatis, apice tenuiter acuminatis, nervis primariis utrinque circiter 10, supra haud distinctis, subtus perspicuis, elevatis, curvato-adscendentibus, obscure anastomosantibus, reticulo venularum distincto; petiolo 1–1.5 cm. longo, leviter villoso; inflorescentiis in axillis superioribus, longe pedunculatis, paucifloris, plus minusve subcinereo-pubescentibus, 6–8 cm. longis; floribus 5–10, albidis, circiter 6 mm. longis, pedunculo 4–5 cm. longo; sepalis rigidis, erectis, ellipticis, obtusis, 3.5–4 mm. longis, coriaceis, imbricatis, utrinque breviter pubescentibus; staminibus interioribus circiter 2.5 mm. longis, distincte villosis, antheris oblongis, truncatis, glandulis glabris vel subglabris, sessilibus, circiter 0.5 mm. diametro, staminibus exterioribus (6) quam interioribus paullo longioribus, minus pubescentibus; staminodiis sagittatis, stipitatis, usque ad 2 mm. longis, villosis; ovario glabro, stylis 1.5 mm. longis.

KWANGTUNG PROVINCE: Lung Tau Mountain, near Iu, North River region, June 3, 1924, Canton Christian College no. 12379 (Wulsin Expedition). In forested ravines; local name "tung kau shu."

A species characterized by its sparse villous indumentum, and its lanceolate, pale, sharply and conspicuously acuminate narrow leaves nerved beneath. In general it belongs in the group with *Phoebe Sheareri* Gamble, but is remote from that species.

HAMAMELIDACEAE

Liquidambar Linnaeus

Liquidambar edentata, sp. nov.

Species *L. formosanae* affinis, differt foliis minoribus, margine integris, haud crenatis vel dentatis. Ut videtur arbor parva, inflorescentiis exceptis glabra, ramis ramulisque tenuibus, laevibus, teretibus, nitidis, olivaceis, ramulis vix 1 mm. diametro; foliis viridibus, nitidis, ovatis, 3-lobatis, membranaceis, 5–8 cm. longis, 3.5–7 cm. latis, basi rotundatis, 3-nerviis, subtus in axillis barbatis, margine integris, lobis lateralibus patulo adscendentibus, longe acuminatis, 2–3 cm. longis, e basi ovata, lanceolatis, centrali quam lateralibus longiore, iis simillimo, 3–5 cm. longis; petiolo tenui, 1.5–6.5 cm. longo; pedunculis elongatis, glabris, capitulis femineis junioribus globosis, circiter 2 cm. diametro, stylis pubescentibus, lineari-lanceolatis, curvatis, circiter 9 mm. longis.

FUKIEN PROVINCE: without definite locality, probably from near Foochow, *F. P. Metcalf* and *T. C. Chang*, no. 877.

Manifestly allied to *Liquidambar formosana* Hance but with distinctly smaller leaves, their margins, aside from the three prominent lobes, quite entire, not at all toothed, base rounded, not at all cordate.

SAXIFRAGACEAE

Hydrangea Linnaeus

Hydrangea kwangtungensis, sp. nov. (§ *Euhydrangea, Heteromallae*).

Frutex erectus, circiter 1 m. altus, perspicue villosus, ramis ramulisque brunneis, villosis, ramulis circiter 2 mm. diametro; foliis lanceolatis ad oblongo-lanceolatis, membranaceis, mollibus, 5–11 cm. longis, 1.5–3 cm. latis, in sicco pallide viridibus, subtus paullo pallidioribus, utrinque subaequaliter angustatis, basi acutis, apice acuminatis, margine distanter apiculato-serrulatis ad integris, in parte inferiore semper integris, utrinque molliter villosis pilis dispersis subpatulis pallidis, nervis primariis utrinque circiter 6, tenuibus, distinctis, curvato-adscendentibus, arcuato-anastomosantibus, reticulo venularum laxo; petiolo dense villoso, 4–8 mm. longo; cymis densis, convexis, circiter 5 cm. diametro, dense molliter villosis, multifloris; floribus albidis, omnibus fertilibus, parvis, 5-meris, pedicellis usque ad 4.5 mm. longis; calycis tubo disperse villoso, lobis 5, oblongo-ovatis, acutis, circiter 1.4 mm. longis, membranaceis, utrinque parcissime villosis; petalis membranaceis, liberis, deciduis, glabris, oblongo-ellipticis ad anguste oblongo-obovatis, 3 mm. longis, acutis ad leviter acuminatis; staminibus 10, glabris, filamentis ad 1.5 mm. longis, antheris ellipsoideis, vix 1 mm. longis; stylis 3 vel 4, circiter 1 mm. longis, ovario infero; floribus sterilibus radiantibus nullis.

Kwangtung Province: Lung T'au Mountain, near Iu, North River region, May 22, 1924, Canton Christian College no. 12017 (Wulsin Expedition).

A species in some respects resembling *Hydrangea villosa* Rehder but differing in numerous details. In the material at hand there is no indication of any sterile radial flowers. It is well characterized by its soft villous indumentum.

LEGUMINOSAE

Caesalpinia Linnaeus

Caesalpinia kwangtungensis, sp. nov.

Species *C. nugae* Ait. affinis, differt leguminibus minoribus, valde inaequilateraliter ovatis, basi uno latere latissime rotundatis altero acutis, apice perspicue acuminatis. Frutex scandens, glaber (floribus ignotis), ramis ramulisque teretibus, laevibus, nitidis, atro-olivaceis; foliis 15–25 cm. longis, bipinnatis, rhachi infra spinis brevibus recurvatis instructa; pinnis circiter 5-jugis, usque ad 9 cm. longis, rhachi haud spinosa, foliolis 4–5-jugis, ellipticis ad obovato-ellipticis, aequilateralibus, chartaceis ad subcoriaceis, pallide olivaceis, nitidis, subtus pallidioribus, utrinque glaberrimis, dense reticulatis, 2–3 cm. longis, 1–1.8 cm. latis, apice obtusis ad rotundatis, basi late acutis, nervis primariis utrinque circiter 10, distinctis, petiolulis 1–2 mm. longis; infructescentiis paniculatis, ramis ultimis usque ad 10 cm. longis, fructibus racemose dispositis; leguminibus compressis, valde oblique ovoideis, castaneis, leviter

reticulatis, glabris, 2–3 cm. longis, 1.7–2 cm. latis, basi uno latere latissime rotundatis, altero attenuato, apice perspicue acuminatis, seminibus ut videtur solitariis; pedicellis 1–1.5 cm. longis.

KWANGTUNG PROVINCE: near Fung Wan Hu, among rocks, North River region, July 14, 1924, Canton Christian College no. 12838 (Wulsin Expedition).

A species with vegetative characters clearly approaching those of *Caesalpinia nuga* Ait. and *C. szechuenensis* Craib, differing from both in its peculiarly and strongly inequilateral pods, the narrower side acute at the base and only slightly curved, the broader side broadly rounded at the base and semicircular in outline.

EUPHORBIACEAE

Discocleidion Pax & K. Hoffmann

Discocleidion glabrum, sp. nov.

Frutex erectus, glaber, ramis ramulisque teretibus, laevibus, vel ramis leviter lenticellatis; foliis alternis, ovatis ad oblongo-ovatis, chartaceis, viridibus, utrinque subconcoloribus, 8–15 cm. longis, 4–9 cm. latis, longe acuminatis, basi rotundatis, 3-nerviis, subtus utrinque 1–3-maculari-glandulosis, stipellatis, margine perspicue crenato-serratis, nervis utrinque praeter basales 4 vel 5, adscendentibus, subtus perspicuis; petiolo 1–6 cm. longo; stipulis anguste lanceolatis, acuminatis, circiter 4 mm. longis, stipellis oblongis, incrassatis, obtusis, 1–2 mm. longis; inflorescentiis femineis glabris, depauperato-paniculatis, foliis aequantibus, paucifloris, pedicellis usque ad 5 mm. longis, bracteis oblongo-ovatis, acuminatis, circiter 2 mm. longis, eglandulosis; sepalis plerumque 4, ovatis ad lanceolatis, acuminatis, glaberrimis, 2–2.5 mm. longis; ovario glabro, laevi; stylis 3, bifidis, 2 mm. longis, papillosis.

ANHWEI PROVINCE: Wu Yuen, *K. Ling*, no. 7866, August 24, 1924; a shrub near streams.

Although the staminate flowers are unknown I have not hesitated in placing this in Discocleidion rather than in Alchornea because of the very short cleft styles. The plant is entirely glabrous except that in some flowers examined the rounded angles of the ovary are supplied with a line of short appressed hairs. If correctly placed within the genus Discocleidion the species is most closely allied to *D. ulmifolium* (Muell. Arg.) Pax & Hoffm. of the Liu Kiu Islands, differing in its much larger leaves.

AQUIFOLIACEAE

Ilex Linnaeus

Ilex kwangtungensis, sp. nov. (§ *Euilex, Leioprinus?*).

Arbor parva, 3–6 m. alta, ramis teretibus, atris vel atro-purpureis, ramulis dispersе breviter subferrugineo-pubescentibus, plus minusve compressis, circiter 2 mm. diametro; foliis subcoriaceis ad coriaceis,

rigidis, oblongo-ellipticis ad oblongo-ovatis, 8–14 cm. longis, 3–6 cm. latis, basi acutis ad rotundatis, apice distincte acuminatis, margine plerumque revolutis, minute serrulatis, interdum integris vel subintegris, supra atro-olivaceis, subtus brunneis, epunctatis, utrinque parce disperse breviter pubescentibus glabrescentibus, nervis primariis utrinque 8–10, subtus perspicuis, elevatis, arcuato-anastomosantibus, reticulo venularum laxissimo; petiolo 1–1.5 cm. longo; inflorescentiis axillaribus, pedunculatis, solitariis, parce breviter subcinereo-pubescentibus, circiter 10-floris, subcymosis, circiter 3 cm. longis, plerumque bracteis solitariis foliaceis lanceolatis usque ad 1.5 cm. longis instructis, pedunculo circiter 1 cm. longo; pedicellis 5–10 mm. longis; floribus rubris, 4-meris, circiter 6 mm. diametro; sepalis orbiculari-ovatis, rotundatis, subcinereo-puberulis, coriaceis, 1–1.5 mm. diametro; corollae lobis patulis, ellipticis, glabris, rotundatis, 3 mm. longis; antheris sterilibus ovoideis, obtusis, 1.2 mm. longis, quam filamenta paullo longioribus; ovario glabro, 4-loculari, ovoideo.

KWANGTUNG PROVINCE: Lung T'au Mountain, near Iu, North River region, June and July, 1924, Canton Christian College, nos. 12383, 12471 (type), 12764 (Wulsin Expedition). In forested ravines, local names "sai fui shu, yau lap shu."

I am by no means certain that this has been placed in its proper section, although it clearly appears to represent an undescribed form. It is characterized by its sparse, short indumentum, its coriaceous, minutely toothed leaves, and its relatively large flowers. The inflorescences are distinctly subcymose, the short branchlets frequently 3-flowered.

THEACEAE

Thea Linnaeus

Thea microphylla, sp nov. (§ *Camellia*).

Frutex, ramulis et petiolis et foliis supra ad costam plus minusve pubescentibus, ramis glabris, subcinereis, ramulis tenuibus, 0.5–1 mm. diametro, junioribus breviter hirsutis; foliis oblongo-ellipticis ad anguste elliptico-obovatis, 2–2.5 cm. longis, 7–12 mm. latis, coriaceis vel subcoriaceis, olivaceis ad olivaceo-viridibus, nitidis, utrinque subconcoloribus, disperse verruculosis, apice obtusis ad rotundatis, basi cuneatis, margine crenulatis ad crenulato-denticulatis, dentibus minute apiculatis, nervis primariis utrinque circiter 4, distantibus, obscuris, reticulo venularum laxo subobsoleto; petiolo 1–2 mm. longo, leviter hirsuto; alabastris axillaribus, solitariis, sessilibus, bracteis glabris vel ad apicem plus minusve pubescentibus, ovatis, coriaceis, 2–3 mm. longis; fructibus sessilibus, subovoideis, circiter 1.5 cm. diametro, verruculosis, junioribus leviter pubescentibus, irregulariter dehiscentibus, seminibus ut videtur plerumque 2, circiter 1.2 cm. longis; sepalis deciduis.

ANHWEI PROVINCE: Wu yuen and Shu Ling Shien, *N. K. Ip*, no. 7686,

K. Ling, no. 7830, August, 1924. In level low lands and in bamboo forests.

Although the flowers are unknown this is clearly a representative of the genus Thea, and of the section Camellia Szysz. It is sharply defined by its very small, rounded to obtuse, obscurely nerved leaves which do not exceed 2.5 cm. in length. A sterile specimen from Chekiang Province, *R. C. Ching*, No. 2160, from between Ping Yung and Tai Suan probably represents the same species, its branchlets and younger branches being clothed with long, weak, spreading pale hairs.

Ternstroemia Mutis

Ternstroemia nitida, sp. nov.

Species *T. gymnantherae* Sprague (*T. japonicae* auctt.) affinis, differt foliis tenuioribus, utrinque valde nitidis, nervis lateralibus distinctis.—Arbor glaberrima, 10–13 m. alta, ramis teretibus, ramulis 2–2.5 mm. diametro; foliis integris, firme chartaceis ad subcoriaceis, oblongo-ellipticis ad anguste oblongo-obovatis, 6–10 cm. longis, 2.5–4 cm. latis, apice distincte sed obtuse acuminatis, basi cuneatis, in sicco utrinque valde nitidis, supra atro-olivaceis ad pallide olivaceis, subtus paullo pallidioribus, nervis primariis utrinque 7–9, tenuibus, subtus distinctis, arcuato-anastomosantibus, reticulo venularum laxo; petiolo 1–1.5 cm. longo; floribus masculis axillaribus, solitariis, albidis, pedicellis circiter 1 cm. longis; sepalis 5, coriaceis, glabris, ellipticis ad late ellipticis, rotundatis, margine integerrimis, 5 mm. longis; petalis ovatis, glabris, late rotundatis vel leviter retusis, 7 mm. longis; staminibus circiter 35, filamentis circiter 2 mm. longis, antheris filamenta subaequantibus, anguste oblongis.

Kwangtung Province: Lung T'au Mountain, near Iu, North River region, June, 1924, Canton Christian College no. 12590 (type) (Wulsin Expedition). A tree 40 feet high in forested ravines. The same species is manifestly represented by *R. C. Ching*, no. 2063 from Suan Ke, south of Ping Yung, Chekiang Province.

FLACOURTIACEAE

Bennettiodendron, nom. nov.

(*Bennettia* Miquel, Fl. Ind. Bot. 1. pt. 105 (1859); non R. Br., nec S. F. Gray)

Bennettiodendron brevipes, sp. nov.

Arbor parva, circiter 6 m. alta, ramulis junioribus inflorescentiisque perspicue pubescentibus exceptis glabra, ramis teretibus, glabris; foliis chartaceis, oblongo-oblanceolatis ad obovato-oblanceolatis, utrinque subconcoloribus, nitidis, 5–12 cm. longis, 2–5 cm. latis, acuminatis, basi acutis, distanter glanduloso-serratis, dentibus brevibus, obtusis, nervis primariis utrinque 7–9, perspicuis; petiolis 3–13 mm. longis, pilosis vel dense pubescentibus; inflorescentiis terminalibus, ciliatis vel pubescentibus, 6–12 cm. longis, usque ad 4.5 cm. latis, multifloris, floribus in ramis

primariis racemoso-umbellatim dispositis; floribus femineis sepalis 3, elliptico-ovatis, obtusis, 3–3.5 mm. longis, obscure ciliatis, deciduis; staminodiis numerosis, circiter 1.2 mm. longis, filamentis ciliatis, glandulis numerosis, obovoideis, glabris, incrassatis, usque ad 0.5 mm. longis; ovario glabro, ovoideo, ovulis paucis (circiter 8), stylis 3 vel 4, patulis, 1–1.5 mm. longis; fructibus junioribus ovoideis, circiter 3.5 mm. longis.

KWANGTUNG PROVINCE: Lung T'au Mountain, near Iu, North River region, June, 1924, Canton Christian College, Nos. 12473 (type), 12623 (Wulsin Expedition). In forested ravines; local name "shan kwai fa." The same species is apparently represented by Rock, No. 2689 from southern Yunnan.

This species is characterized by its pubescent branchlets and inflorescences, short petioles, and numerous lateral nerves, as compared with the two closely allied species from southern Asia and western Malaysia currently known as *Bennettia leprosipes* Koord., and *B. longipes* Oliv. The genus is new to China.

I have proposed a new name for this genus to avoid confusion with the genera Bennettia R. Brown and Bennettia S. F. Gray, both much earlier than Miquel's use of the same name; Robert Brown's Bennettia is a synonym of Galearia of the Euphorbiaceae, and S. F. Gray's Bennettia is a synonym of Saussurea of the Compositae. The known species of Bennettiodendron are as follows:

Bennettiodendron leprosipes (Clos), comb. nov.

Xylosma leprosipes Clos in Ann. Sci. Nat. Bot. sér. 4, VIII. 233 (1857).
Bennettia Horsfieldii Miquel, Fl. Ind. Bat. I. pt. II. 105 (1859).
Myroxylon leprosipes Kuntze, Rev. Gen. Pl. I. 44 (1891).
Bennettia leprosipes Koorders, Exkursionsfl. Java, II. 635 (1912); Koorders & Valeton, Atlas Baumart. Java, II. fig. 336, 337 (1914).

JAVA, SUMATRA.

Bennettiodendron longipes (Oliv.), comb. nov.

Bennettia longipes Bennett in Hooker's Icon. XVI. t. 1596 (1887).

SILHET.

Bennettiodendron papuanum (Gilg), comb. nov.

Bennettia papuana Gilg in Bot. Jahrb. LV. 283 (1918).

NEW GUINEA.

MELASTOMATACEAE

Bredia Blume

Bredia chinensis, sp. nov.

Frutex circiter 1 m. altus, ramosus, ramis teretibus, glabris, ramulis plus minusve patule hirsutis, junioribus circiter 1 m. diametro, furfuraceis et perspicue capitato-glandulosis, pilis capitatis tenuibus, patulis, usque ad 1.5 mm. longis; foliis oppositis, chartaceis, glabris vel junioribus parce furfuraceis, ovatis ad oblongo-ovatis, distanter serrulatis, olivaceis vel atro-viridibus, subtus pallide viridibus, laevibus, distincte acuminatis, basi rotundatis, perspicue 3- vel obscure 5-nerviis, haud 3- vel 5-plinerviis

3–7 cm. longis, 1.5–4.5 cm. latis, nervulis transversalibus tenuibus obscuris; petiolo 1–2.5 cm. longo; paniculis terminalibus pedunculatis, 4–8 cm. longis, furfuraceis et perspicue capitato-glandulosis; floribus roseis, 4-meris, pedicellatis, calycibus subcupulatis, circiter 4 mm. longis, parce furfuraceis et disperse capitato-glandulosis, lobis 4, late ovatis, haud 1 mm. longis; petalis 4, elliptico-ovatis ad late ovatis, breviter acuminatis, circiter 6 mm. longis, glabris; staminibus 8, inaequalibus, majoribus filamentis 8 mm. longis, antheris anguste lanceolatis, tenuiter acuminatis, curvatis, 8 mm. longis, basi antice obscure bicallosis, minoribus rectis, crassioribus, lanceolatis, 4 mm. longis, basi antice perspicue bicallosis, postice 1-callosis.

CHEKIANG PROVINCE: without definite locality, *H. H. Hu*, no. 30 (type), August, 1920, distributed as *Barthea chinensis* Hook. f.; Sze-ton, south of Siachu, *R. C. Ching*, no. 1684, May June, 1924. FUKIEN PROVINCE, near the Chekiang border *R. C. Ching*, no. 2309, August, 1924.

In many respects this resembles *Bredia hirsuta* Blume of Japan and Formosa, differing in its smaller, glabrous not cordate, fewer nerved leaves, which are 3- or sometimes 5-nerved, not 3–7-nerved, as well as in its capitate-glandular hairs on the younger branchlets and inflorescences. In the latter character it more closely resembles the Formosan *Bredia scandens* Hayata but in other respects it is remote from that species.

Bredia glabra, sp. nov.

Frutex glaber, circiter 1 m. altus, ramis ramulisque teretibus, ramulis 1–1.5 mm. diametro; foliis oppositis, chartaceis ad subcoriaceis, ovatis ad oblongo-ovatis, 4–9 cm. longis, 1.5–4.5 cm. latis, obscure distanter serrulatis ad integris, acutis vel leviter acuminatis, basi plerumque acutis, 3- vel obscurissime 5-nerviis, laevibus, supra olivaceis, subtus viridibus vel flavido-viridibus, nervis transversalibus venulisque obsoletis vel obscuris, petiolo 4–20 mm. longo; inflorescentiis terminalibus, paucifloris, 2–4 cm. longis, breviter pedunculatis, junioribus interdum parcissime obscure breviter stellato-pubescentibus; floribus plerumque 3, pedicellatis, roseis, 4-meris; calycibus cupulatis, circiter 6 mm. longis latisque, limbo plus minusve producto, truncato, extus breviter 4-calloso; petalis elliptico-ovatis, circiter 9 mm. longis, leviter acuminatis vel acutis; staminibus 8 inaequalibus, majoribus filamentis 9–10 mm. longis, antheris lanceolatis, acuminatis, curvatis, 1 cm. longis, connectivo leviter producto, antice brevissime 2-calloso, postice inappendiculato vel obscurissime 1-calloso, minoribus filamentis 6 mm. longis, antheris circiter 8 mm. longis, antice perspicue basi 2-callosis, postice 1-callosis.

CHEKIANG PROVINCE: Pinyung Hsien, on slopes, *Ling Kan*, no. 7333, July, 1924. The same species is represented by *R. C. Ching*, no. 2029 in the United States National Herbarium from the same locality,

July, 1924, growing on open wet grassy slopes at an altitude of about 1400 m.

In making the preliminary identifications both of these specimens were tentatively referred to *Barthea chinensis* Hook. f., which in superficial characters the present species closely resembles. An examination of the flowers however shows that Bredia is clearly the proper genus. It is distinguished by its being glabrous or nearly so, by its 3-nerved entire or obscurely toothed leaves, and by its few relatively large flowers.

Tashiroea Matsumura

Tashiroea sp.?

ANWHEI PROVINCE: Wu Yuan, *R. C. Ching*, no. 4579 (Nanking Univ. Herb. no. 8985), September, 1925. On open moist slopes at an altitude of about 600 m.

The specimen is in fruit, hence the generic identification is doubtful. It rather closely approximates *Tashiroea okinawensis* Mats. of the Liu Kiu Islands. The genus is known from two or three species in the Liu Kiu Islands and Formosa, but has not been previously recorded from China.

MYRSINACEAE

Ardisia Swartz

Ardisia pseudoverticillata, sp. nov. (§ *Acrardisia*).

Frutex erectus, ut videtur haud ramosus, circiter 1 m. altus, caulibus circiter 8 mm. diametro; foliis circiter 4, ad apicem pseudoverticillatim dispositis, petiolatis, oblongis, chartaceis, 15–20 cm. longis, 4.5–7 cm. latis glabris, utrinque perspicue glandulosis, glandulis paucis, elevatis, late dispersis, basi acutis, apice plus minusve acuminatis, margine dense apiculato-serratis dentibus patulis haud 1 mm. longis, supra in sicco subcastaneo-olivaceis, subtus pallide viridibus, nervis primariis utrinque 10–12, distantibus, subtus perspicuis, arcuato-anastomosantibus, reticulo venularum laxo; petiolo 1–1.5 cm. longo; inflorescentiis circiter 4, terminalibus, foliis aequantibus, puberulis, multifloris, floribus in ramis primariis racemose dispositis, ramis patulis, tenuibus, 2–4 cm. longis, bracteis foliaceis lanceolatis, perspicue glandulosis, 1–1.5 cm. longis, pedicellis 6–12 mm. longis; sepalis oblongo-ovatis, acutis ad leviter acuminatis, apertis, 1–1.2 mm. longis, in parte superiore parcissime glandulosis, margine breviter obscure ciliatis; petalis glabris, roseis, oblongo-ovatis, acutis, circiter 4 mm. longis, in parte superiore parce glandulosis; antheris ovoideis, obtusis, 1.7 mm. longis, connectivo haud glanduloso, filamentis brevissimis, crassis; ovario ovoideo, glabro, stylis contortis, usque ad 5 mm. longis, ante anthesin haud porrectis.

KWANGTUNG PROVINCE: Lung T'au Mountain, near Iu, North River region, July 4, 1924, Canton Christian College no. 12657 (Wulsin Expedition). In ravines; local name "tsau ma t'oi."

A very strongly characterized species apparently not closely allied to any previously described form. Its striking characters are its erect, apparently unbranched stems, the plant attaining a height of 1 m., the densely toothed and conspicuously but distantly glandular leaves being pseudoverticillately arranged at the apex of the stem. The terminal inflorescences, one to each leaf, are narrowly paniculate, many flowered, puberulent, and as long as the leaves, the flowers being racemosely disposed along the upper part of the primary branches.

Myrsine Linnaeus

The species recently described by me from Indo-China as *Embelia acuminata* certainly belongs in Myrsine, and is here transferred to that genus:

Myrsine integrifolia, nom. nov.

Embelia acuminata Merrill in Univ. Calif. Publ. Bot. XIII. 139 (1926).—Non *Myrsine acuminata* Royle.

INDO-CHINA: Tonkin, Chapa, *Petelot*, nos. 1779, 1936.

Manifestly allied to the Chinese *Myrsine marginata* Mez, but with entire leaves, no marginal nerves, the lateral nerves obsolete or nearly obsolete beneath.

SYMPLOCACEAE

Symplocos Jacquin

Symplocos lungtauensis, sp. nov. (§ *Bobua*, *Lodhra*).

Frutex circiter 2 m. altus, ramis teretibus, glabris, ramulis circiter 2 mm. diametro, dense sordide villosis; foliis flavido-viridibus, nitidis, utrinque concoloribus, submembranaceis ad chartaceis, oblongis, 5–8 cm. longis, 2–3 cm. latis, basi acutis ad subrotundatis, apice tenuiter acute acuminatis, margine plerumque revolutis, integris vel sursum distanter argute serrulatis, supra ad costam et in parte inferiore disperse pubescentibus, subtus molliter villosis, nervis primariis utrinque 7–9, tenuibus, perspicuis, utrinque ut costa leviter elevatis, reticulo venularum laxo; petiolo villoso, 2–4 mm. longo; floribus axillaribus, solitariis, ut videtur flavidis, interdum solitariis, plerumque in spicis brevissimis (vix 3 mm. longis) dispositis, bracteolis late ovatis, pubescentibus, 1–1.4 mm. longis; calycibus plus minusve villosis, lobis orbiculari-ovatis, rotundatis, haud 1 mm. longis; petalis subliberis, membranaceis oblongis, glabris, 3–4 mm. longis; filamentis numerosis, glabris, basi brevissime connatis, 4–5 mm. longis; fructibus oblongo-ellipsoideis, disperse pubescentibus, 6–8 mm. longis, circiter 4 mm. diametro.

KWANGTUNG PROVINCE: Lung T'au Mountain, near Iu, in forests, North River region, May, 1924, Canton Christian College, no. 12066 (Wulsin Expedition).

A species well characterized by its pubescent leaves and branchlets, and its very short spicate inflorescences, or the flowers sometimes solitary

or even fascicled. The floral characters given in the diagnosis are from very old flowers. This seems clearly to fall in the group with *Symplocos anomala* Brand, but is not closely related to that species.

STYRACACEAE

Styrax Linnaeus

Styrax parviflorus, sp. nov. (§ *Eustyrax, Valvatae*).

Arbor parva, usque ad 7 m. alta, inflorescentiis floribusque minute cinereo-puberulis exceptis glabra, ramis ramulisque teretibus, glaberrimis; foliis coriaceis vel subcoriaceis, plerisque oblongo-ellipticis, integerrimis, utrinque subaequaliter angustatis, basi acutis, apice distincte acuminatis, in sicco utrinque concoloribus, nitidis, glaberrimis, 6–11 cm. longis, 2.5–4.5 cm. latis, nervis primariis utrinque 5–6, curvatis, subtus distinctis, obscure arcuato-anastomosantibus, reticulo venularum primariarum laxo; petiolo glabro, 7–9 mm. longo; inflorescentiis plerisque axillaribus, depauperato-paniculatis, usque ad 5 cm. longis, paucifloris, uniformiter dense cinereo-puberulis, pedicellis usque ad 5 mm. longis; floribus parvis, calycibus puberulis, cupulatis, breviter acute 5-dentatis, 2–2.5 mm. longis; petalis 5, subliberis, ut videtur valvatis, utrinque minute cinereo-puberulis, oblongis, obtusis, circiter 6 mm. longis et 2.3 mm. latis; staminibus 10, filamentis compressis, circiter 3 mm. longis, utrinque puberulis, antheris filamentis aequilongis glabris, anguste oblongis, connectivo pro rata lato, apice breviter 3-lobato, lobis minutis, acutis, medianis quam lateralibus multo minoribus; ovario 4-loculari, puberulo; stylis 7 mm. longis, puberulis, brevissime 3-lobatis; fructibus junioribus cernuis, ellipsoideis, cinereo-puberulis, circiter 5 mm. longis, apice distincte rostratis.

Kwangtung Province: Lung T'au Mountain, near Iu, on forested slopes, North River region, May and June, 1924, Canton Christian College nos. 12070 (type), 12349 (Wulsin Expedition). Color of the flowers indicated as purple.

A very strongly marked species characterized by its unusually small flowers and apparently small fruits which are distinctly cernuous, as well as by its entirely glabrous branchlets and leaves. The three minute terminal teeth on the connectives are unusual. The first specimen cited is just beyond the flowering stage, but one complete flower and fragments of others were found with it; the second specimen has immature fruits, being collected about two weeks later.

APOCYNACEAE

Pottsia Hooker & Arnott

Pottsia grandiflora Markgraf in Notizbl. Bot. Gard. Mus. Berlin, ix. 1029 (1926).[1]

Frutex alte scandens, glaber, ramis ramulisque teretibus, subpurpureis, ramulis circiter 2 mm. diametro; foliis ovatis ad elliptico-ovatis, 7–9

[1] See note on p. 68.

cm. longis, 4–4.5 cm. latis, subcoriaceis, in sicco rigidis, supra pallide olivaceis vel olivaceo-brunneis, subtus pallidioribus, brunneis, utrinque glaberrimis, basi plerumque rotundatis, saepe leviter decurrentibus, apice perspicue obtuseque acuminatis, nervis primariis utrinque circiter 6, tenuibus, subtus cum venulis subcastaneis, perspicuis; petiolo 1–1.5 cm. longo; inflorescentiis terminalibus, pedunculatis, subdiffusis, multifloris, subdichotime ramosis, pedunculatis, circiter 15 cm. longis latisque, ramis ramulisque bracteis foliaceis oblongis 1–1.5 cm. longis suffultis; floribus rubris vel purpureis, pedicellis usque ad 1.3 cm. longis; calycis tubo subcupulato, circiter 2.5 mm. diametro, glabro, lobis late ovatis, acutis, 2 2.5 mm. longis, margine obscure ciliatis, intus ad basin squamulis multis instructis; corollae tubo cylindrico, circiter 6 mm. longo, 3 mm. diametro, extus glabro, lobis magnis, quam tubus longioribus, reflexis, inaequilateraliter obovatis, imbricatis, circiter 8 mm. longis; filamentis intus in parte inferiore ad tubum adherente pubescentibus, in parte libera glabris, 2 mm. longis; antheris oblongis, acuminatis, basi sagittatis, 3 mm. longis, omnino exsertis; disco glabro, ovoideo, 2 mm. longo, crasso, crenato; carpellis inclusis glabris, stylis 6 mm. longis, basi angustatis, sursum inflatis, inde attenuatis, distincte fusiformibus.

KWANGTUNG PROVINCE: Lung T'au Mountain, near Iu, North River region, June 3, 1924, Canton Christian College no. 12318 (Wulsin Expedition). In ravines, a vine about 12 m. long, flowers red and purple.—Mr. Rehder states that Hongkong herb. no. 2912 collected by S. T. Dunn in Fukien province apparently represents the same species.

A species manifestly belonging in Pottsia, but radically different from *P. laxiflora* (Blume) Ktze. in its floral characters, the flowers being much larger, the calyx lobes equalling the broadly cupshaped tube, while the large corolla lobes, which are reflexed in anthesis exceed the corolla tube in length. The scales forming the disk are united for at least two-thirds their length, this being the only character I have detected in which the present species differs from Pottsia as described, in the type species of the genus the disk glands or scales being nearly free.

VERBENACEAE

Callicarpa Linnaeus

Callicarpa Lingii, sp. nov.

Frutex glaber vel subglaber, ramis pallidis, teretibus, glabris, ramulis circiter 2 mm. diametro, teretibus, minute stellato-puberulis, internodiis usque ad 9 cm. longis; foliis chartaceis vel submembranaceis, utrinque glabris vel junioribus supra obscurissime puberulis, brevissime petiolatis vel subsessilibus, oblongis, 15 –22 cm. longis, 5 6.5 cm. latis, supra olivaceo-viridibus, subtus paullo pallidioribus, disperse aureo-glandulosis, apice distincte acuminatis, deorsum angustatis, basi circiter 7 mm. latis, abrupte obtusis, margine remote minuteque calloso-denticulatis, nervis primariis utrinque 10–12, distantibus, curvatis, distinctis, laxe arcuato-

anastomosantibus, reticulo venularum laxo; petiolo vix 1 mm. longo, parce stellato-puberulo; infructescentiis solitariis supra-axillaribus, cymosis, circiter 2.5 cm. longis, minute decidue stellato-puberulis, vix pedunculatis, paullo supra basin ramosis, ramulis pedicellisque brevibus glabris vel subglabris, bracteis lineari-lanceolatis, 1–2 mm. longis; calycibus sub fructu glabris, circiter 3 mm. diametro, leviter undulato-crenatis; fructibus late ovoideis vel subobovoideis, glabris, circiter 3 mm. longis.

ANHWEI PROVINCE: Wu Yuen, in forests, *K. Ling*, no. 7851, August 23, 1924.

The alliance of this species is manifestly with *Callicarpa brevipes* Hance from which it is at once distinguished by being nearly glabrous except for the branchlets and the inflorescences, as well as by its much longer glabrous leaves.

RUBIACEAE

Hedyotis Linnaeus

Hedyotis Wulsinii, sp. nov. (§ *Dimetia*).

Suffruticosa, ut videtur scandens, caulibus viridibus, circiter 4 mm. diametro, distincte 4-angulatis, glabris, laevibus, initio parce pubescentibus, internodiis 8–15 cm. longis, ramis circiter 2 mm. diametro, acute 4-angulatis; foliis oppositis, lanceolatis ad oblongo-lanceolatis, 6–12 cm. longis, 1.5–3 cm. latis, supra viridibus, subtus paullo pallidioribus, utrinque minute scaberulis et distincte disperse pubescentibus pilis brevibus pallidis, tenuiter acute acuminatis vel acutis, basi acutis ad decurrente-acuminatis, nervis primariis utrinque 3 vel 4, adscendentibus, supra obscuris, subtus valde perspicuis, elevatis, reticulo venularum obscuro vel obsoleto; petiolo 2–8 mm. longo; stipulis ovatis, laciniato-lobatis, lobis usque ad 10, interioribus usque ad 3 mm. longis, angustis, exterioribus gradatim brevioribus; inflorescentiis axillaribus terminalibusque, paniculatis, diffusis, pedunculatis, 15–30 cm. longis, disperse subhirsutis, cymulis laxis; floribus numerosis, albidis ad subpurpureis, 4-meris, perspicue subhirsutis, calycibus dense hirsutis, tubo ovoideo, lobis oblongis, acutis ad obtusis, viridibus; corollae tubo glabro, 1.5 mm. longo, lobis lanceolatis, acuminatis, circiter 6 mm. longis, 1.2 mm. latis, acutis vel acuminatis, intus dense longe villosis, extus breviter disperse hirsutis; stylis glabris, 6 mm. longis; filamentis glabris, 2.5–3 mm. longis, quam antherae duplo longioribus; pedicellis 3–10 mm. longis, bracteis parvis, oblongis, circiter 1 mm. longis.

KWANGTUNG PROVINCE: Lung T'au Mountain, near Iu, North River region, on slopes, June, 1924, Canton Christian College nos. 12023 (type), 12206 (Wulsin Expedition). Local name "tsak u t'am."

A species clearly belonging in the group with *Hedyotis capitellata* Wall. and *H. macrostemon* Hook. & Arn., differing radically in its laxly disposed flowers, the pedicels varying from 3–10 mm. in length. The

indumentum is characteristic, particularly that of the corolla lobes, these being densely long pilose on the inside and with short, scattered, rather stiff hairs on the outside.

Hedyotis longipetala, sp. nov. (§ *Diplophragma*).

Suffrutex erectus, ramosus, glaberrimus, 30–40 cm. altus, caulibus rigidis, teretibus, griseis, 4–6 mm. diametro, ramis numerosis, adscendentibus, vetustioribus 2–3 mm. diametro, teretibus ad subangulatis, internodiis plerumque brevibus, junioribus viridibus, acute 4-angulatis ad anguste 4-alatis; foliis crasse coriaceis, rigidis, lanceolatis ad lineari-lanceolatis, 3–7 cm. longis, 4–12 mm. latis, tenuiter acuminatis, basi cuneatis, margine revolutis, in sicco flavido-viridibus, subtus pallidioribus, rugosis, nervis primariis utrinque 2 vel 3, subtus obsoletis, supra impressis, adscendentibus, saepe obsoletis, reticulo venularum utrinque obsoleto; petiolo 4–8 mm. longo; stipulis 4–5 mm. longis, rigidis, coriaceis, integris, ovatis ad oblongo-ovatis, acuminatis; inflorescentiis axillaribus terminalibusque, floribus axillaribus solitariis ad depauperato-fasciculatis, terminalibus dense subcapitatim dispositis, capitulis (sub fructu) 1.5–2 cm. diametro; floribus ut videtur albidis, 4-meris, pro ratione magnis, subsessilibus vel breviter pedicellatis; corollae tubo cylindrico, glabro, 3.5 mm. longo, lobis lanceolatis, circiter 11 mm. longis, 1.5 mm. latis, extus glabris, intus plus minusve pubescentibus; filamentis glabris, 1 cm. longis, antheris circiter 2 mm. longis; calycibus coriaceis, glaberrimis, tubo ovoideo, supra capsulis longe (circiter 3 mm.) producto, lobis coriaceis, levibus, nitidis, erectis, lanceolatis, acuminatis, circiter 4 mm. longis; capsulis ovoideis ad ellipsoideis, circiter 4 mm. longis.

KWANGTUNG PROVINCE: Shiu Chau (Fu Gung Mountain), and Lung T'au Mountain, near Iu, on mountain top in forest, North River region, June and July, 1924, Canton Christian College nos. 13010 (type), 12419 (Wulsin Expedition). Local name "t'in heung lo."

A very strongly characterized undershrub, recognizable by its habit, being erect, rigid, much branched, with terete stems and sharply 4-angled or narrowly 4-winged branchlets, short internodes, and rigid, coriaceous, practically nerveless leaves, as well as by its fruit and flower characters, the flowers being axillary and terminal, the terminal ones being crowded in subglobose rather compact heads 1.5–2 cm. in diameter. The plant is entirely smooth and glabrous except for the somewhat pubescent inner surface of the petals. The corolla characters were taken from dried and much shrivelled flowers. Specimens sent to Kew were reported by Mr. S. T. Dunn as *Hedyotis* sp. near *H. Lessertiana* Arn. = *Oldenlandia arenaria* Haines.

Lasianthus Jack

Lasianthus caudatifolius, sp. nov. (§ *Pedunculatae*).

Frutex circiter 2 m. altus ramulis et petiolis et foliis supra ad costam et subtus ad costam nervosque disperse ciliatis, ramulis teretibus,

inflorescentiis breviter pedunculatis; ramulis ultimis elongatis, junioribus interdum obscure compressis, tenuibus, 1–2 mm. diametro, olivaceis vel brunneo-olivaceis; foliis lanceolatis ad oblongo-lanceolatis, tenuiter caudato-acuminatis, basi acutis, 8–13 cm. longis, 2–3.5 cm. latis, olivaceis, nitidis, chartaceis ad subcoriaceis, supra costa excepta glaberrimis nervis primariis utrinque 5 vel 6, distinctis, curvato-adscendentibus, arcuato-anastomosantibus, plerumque dense ciliato-hirsuto; petiolo 4–6 mm. longo; stipulis dense pilosis, caducis; infructescentiis axillaribus, solitariis, distincte sed breviter (2–3 mm.) pedunculatis, petiolo breviori-bus, ramis binis, brevissimis, crassis, parce pilosis; floribus ignotis; bracteis ut videtur minutis, deciduis; fructibus globosis vel ovoideis, glabris, circiter 5 mm. diametro, seminibus 5.

Kwangtung Province: Lung T'au Mountain, near Iu, North River region, in ravines, July, 1924, Canton Christian College no. 12692 (Wulsin Expedition). Local name "shan u ts'iu." The same species is apparently represented by Levine & McClure's no. 6915 from Wa Shui Tai.

The alliance of this species with slenderly caudate-acuminate leaves is manifestly with *Lasianthus foetidissimus* A. Chev. and *L. Balansae* Pitard of Indo-China, but the former is entirely glabrous except for the finely pubescent stipules and flowers, while the latter has membranaceous leaves and subquadrangular branchlets which are glabrous except at the hispid nodes; the indumentum in the present species is ciliate rather than hispid. In common with both of the above species this Chinese form has distinctly but shortly peduncled cymes. Its probable ally among the Chinese species is *Lasianthus Fordii* Hance but unfortunately the inflorescence or infructescence of the latter is not described although the presumption is, that the flowers are in sessile fascicles. Hance's species is, according to Hemsley, almost entirely glabrous. The original description of *Lasianthus Fordii* Hance, included also *Lasianthus trichophlebius* Hemsl., the latter as described by Hemsley, being very different from *L. caudatifolius* Merr.

NEW SPECIES AND NEW COMBINATIONS OF CHINESE PLANTS

Woon Young Chun

Ostrya Rehderiana Chun, sp. nov.

Ab *Ostrya japonica* Sarg. differt inflorescentiis laxis spiciformibus, non strobiformibus, involucro basi contracto, nuculis pubescentibus et foliis angustioribus.

Arbor ad 18 m. alta, trunco stricto, 45 cm. diam. (fide Ching), ramis horizontaliter patentibus; cortex intense brunneo-cinereus, asperatus; rami cinerei; ramuli graciles, brunnei, lenticellati, initio sericeo-pu-

bescentes, demum glabri et intense purpurascentes; gemmae cylindrico-ovoideae, lucide virides, acutae, perulis pubescentibus. Folia elliptico-oblonga, 4–10 cm. longa et 3–4 cm. lata, caudato-acuminata, basi cuneata vel rotundata, simpliciter et irregulariter serrata vel obscure duplicato-serrata, supra viridia et parte inferiore costae excepta glabra, subtus pallide viridia, sparse pubescentes. Amenta mascula ad 2 cm. longa, 1–4 fasciculata in apice ramuli brevis subterminalis; bracteis striatis sericeo-pubescentibus praesertim ad marginem, cuspidato-acuminatis. Fructus satis distantes in spica laxa pendula 5–8 cm. longa pedunculo 2–3 cm. longo sericeo-pubescente suffulta; involucrum maturitate brunneum, elliptico-oblongum, 2–2.5 cm. longum et 8 mm. latum, apice rotundatum et apiculatum, basi in stipitem contractum, ad venas minute pubescens; nucula compressa, 8–10 mm. longa, calycis basi sericeo coronata, brunneo-virescens.

WESTERN CHEKIANG: Tien Moh Shan, alt. 400 m. fairly common in open woods, *R. C. Ching*, no. 3385, October 2, 1925 (National Southeastern University Expedition to Anhwei).—Specimens in the herbarium of the National Southeastern University, Nanking, China, and in the herbarium of the Arnold Arboretum.

This species is dedicated to Mr. Alfred Rehder.

Cercis Chingii, Chun, sp. nov.

Ab omnibus speciebus generis facile distinguitur legumine exalato valvis crasse coriaceis seminibus paucis magnis in pulpa fungosa immersis instructo.

Frutex dumosus, ad 6 m. altus; cortex trunci cinereus, laevis; ramuli cinerascentes vel brunneo-purpurascentes, dense minuteque lenticellati, demum obscure cinerei. Folia coriacea, valde variabilia, ovata vel orbicularia ad reniformia, obtuse acuminata, basi late cuneata, rotundata vel cordata, rarius truncata, 5–11 cm. longa et 4–8 cm. lata, supra pallide viridia, subtus glauca et ad venas leviter pubescentia, utrinque minute reticulata; petioli 2–4 cm. longi, apice dilatati. Flores non visi. Fructus in ramis biennibus vel vetustioribus, solitarii vel bini pedunculis strictis circiter 1.8 cm. longis suffulti; legumen loriforme vel anguste oblongum, cuspidato-acuminatum cuspide 3 mm. longa, crasse coriaceum, margine 2 mm. crassum, maturitate valvis patentibus, pallide luteum, margine linea brunnea notatum, non alatum, 3–6-spermum; semina compressa, lucida, fusco-nigra, 4–5 mm. diam., circiter 2 cm. crassa, in pulpa fungosa immersa.

SOUTHERN ANHWEI: 15 li east of Kweichow City, fairly common gregarious shrub along roadside in open, *R. C. Ching*, no. 3332, September 10, 1925 (National Southeastern University Expedition to Anhwei).—Specimens in the herbarium of the National Southeastern University, Nanking, China, in the herbarium of the Arnold Arboretum and in the U. S. National Herbarium.

This species is named in compliment to Mr. R. C. Ching, Botanical Collector and Instructor in the National Southeastern University.

Castanopsis Carlesii (Hemsley) Chun, comb. nov.
Quercus Carlesii Hemsley in Hooker's Icon. xxvi. t. 2591 (1899).
Fokien.

Lithocarpus Fordiana (Hemsley) Chun, comb. nov.
Quercus Fordiana Hemsley in Hooker's Icon. xxvii, t. 2664 (1900).
Yunnan.

Lithocarpus hainanensis (Merrill) Chun, comb. nov.
Quercus hainanensis Merrill in Philip. Jour. Sci. xxiii. 239 (1923).
Hainan.

Vanieria crenata (C. H. Wright) Chun, comb. nov.
Cudrania crenata C. H. Wright in Jour. Linn. Soc. xxvi. 469 (1899).
Kwangtung.

Vanieria fruticosa (Wight) Chun, comb. nov.
Cudrania fruticosa Wight apud Kurz, For. Fl. Brit. Burma, ii. 434 (1877).
Yunnan.

Vanieria pubescens (Trécul) Chun, comb. nov.
Cudrania pubescens Trécul in Ann. Sci. Nat. sér 3, viii. 123 (1847).
Yunnan.

Vanieria Bodinieri (Léveillé) Chun, comb. nov.
Cudrania Bodinieri Léveillé in Rep. Spec. Nov. Reg. Veg. xiii. 265 (1914).
Kwangtung, Hainan.

Phoebe Faberi (Hemsley) Chun, comb. nov.
Machilus Faberi Hemsley in Jour. Linn. Soc. xxvi. 375 (1891).
Hupeh, Szechuan.

Notaphoebe omeiensis (Gamble) Chun, comb. nov.
Alseodaphne omeiensis Gamble in Sargent, Pl. Wilson. ii. 70 (1914).
Szechuan: Omei shan and elsewhere.

In Sargent, Pl. Wilson. ii. 70 (1914) Gamble doubtfully referred this species to Alseodaphne noting that the plant has the appearance of a Phoebe, near *P. lanceolata* Nees, but the unequalled and thickened calyx lobes of the flower and the unequal and thickened perianth and pedicels of the fruit clearly point to Notaphoebe.

Benzoin subcaudataum (Merrill) Chun, comb. nov.
Neolitsea subcaudata Merrill in Philip. Jour. Sci. Bot. xiii. 137 (1918).
Lindera subcaudata Merrill, l. c. xv. 237 (1919).
Hainan.

Benzoin Laureola (Collett & Hemsley) Chun, comb. nov.
Lindera Laureola Collett & Hemsley in Jour. Linn. Soc. xxviii. 119 (1890).
India, Yunnan, Kwangtung, Hainan.

Actinodaphne honkongensis Chun, nom. nov.
Actinodaphne angustifolia Bentham in Fl. Hongk. 293 (1861)—*Non* Nees in Syst. Laur. 600 (1836).
HONGKONG.
Differs from the Indian species for which it was mistaken in the smaller, oblong-lanceolate not glaucous leaves and in the flattened disk-shaped perianth of the fruit.

Neolitsea Playfairi (Hemsley) Chun, comb. nov.
Litsea? Playfairi Hemsley in Jour. Linn. Soc. XXVI. 384 (1891).
KWANGTUNG, HANAIN.
Allied to *N. pulchella* (Meissner) Merrill from which it may be distinguished by the much slenderer and smaller leaves and by being glabrous in all parts except the inflorescence.

Neolitsea chinensis (Gamble) Chun, comb. nov.
Neolitsea lanuginosa var. *chinensis* Gamble in Sargent, Pl. Wilson. II. 79 (1914).
SZECHUAN, HUPEH.
Amply distinct from the Indian species in the glabrescent, oblanceolate, not elliptic leaves which are not green but decidely glaucous on the under surface.

Paulownia tomentosa (Thunberg) Steudel, Nomencl. Bot. II. 278 (1841).
Bignonia tomentosa Thunberg, Fl. Jap. 252 (1784).
Paulownia imperialis Siebold & Zuccarini, Fl. Jap. I. 25, t. 10 (1835).
The combination of Thunberg's older name under Bignonia was made by Steudel but was ascribed to Koch in Sargent, Pl. Wilson. I. 574 (1913) and in Chun, Chinese Econ. Trees, 288 (1922).

Serissa serissoides Druce in Rep. Bot. Exch. Cl. Brit. Isles, 1916, 646 (1917).
Democritea serissoides De Candolle, Prodr. IV. 540 (1830).
Leptodermis nervosa Hutchinson in Sargent, Pl. Wilson. III. 404 (1916).

PSEUDOCYTISUS AND VELLA

ALFRED REHDER

As pointed out already by M. L. Green and T. A. Sprague[1] the type species of the genus Vella is *Vella annua* L. Linnaeus proposed this genus in 1737 in his Hortus Cliffortianus (p. 329) basing it on *Nasturtium sylvestre Valentinum* of Clusius who published a good figure of the plant,[2] and citing also Morison's figure.[3] The first generic description appeared in 1742 in Linnaeus, Genera plantarum (ed. 2, p. 317). In 1753 in his Species plantarum (p. 641), he added to the original species, which he named *Vella annua*, a second species, *V. Pseudocytisus*, and in consequence omitted in

[1] In Kew Bull. Misc. Inform. 1925, p. 51 and 1926, p. 99.
[2] Clusius, Rar. Pl. Hist. 129, fig. on p. 130 (1601).
[3] Morison, Pl. Hist. Univ. II. 301, sect. 3, t. 19, fig. 8 (1680).

the 5th edition of his Genera plantarum, published in 1754, from the description of the pod of Vella the word "pendula" since in *V. Pseudocytisus* the pod is upright and not pendulous, but he did not change the words "dissepimento silicula duplo majore," though the flattened leafy style, which Linnaeus considered an outside extension of the dissepiment, is much shorter in *V. Pseudocytisus* than in *V. annua*. When in 1821 De Candolle[1] separated generically the two Linnaean species of Vella, he unfortunately referred the type species to the genus Carrichtera proposed by Adanson[2] and left *V. Pseudocytisus* under Vella. This disposition has been accepted by all later botanists, until in 1904 O. Kuntze pointed out[3] that the type of Vella was *V. annua* and proposed the name Pseudocytisus for *V. Pseudocytisus* and related species.

There can be no doubt that Kuntze is right in this respect, and as the species have not yet been transferred to Pseudocytisus, I propose the following new combinations:

Pseudocytisus integrifolius, comb. nov.
Vella Pseudocytisus Linnaeus, Spec. 641 (1753).
Vella integrifolia Salisbury, Prodr. 265 (1796).
SPAIN.

Though Salisbury's specific name is a nomen abortivum and does not indicate any difference from the other species of Pseudocytisus which all have entire leaves, having been given by Salisbury in contradistinction to *V. annua*, I have thought it more in keeping with general usage to conserve it, as one is allowed to do according to art. 56 of the International Rules, instead of proposing a new and perhaps more fitting name.

Pseudocytisus spinosus, comb. nov.
Vella spinosa Boissier, Elench. Pl. Nov. 14 (1838).
SPAIN.

Pseudocytisus glabrescens, comb. nov.
Vella glabrescens Cosson, Ill. Fl. Atl. I. 71, t. 48 (1884); Comp. Fl. Atl. II. 277 (1887).
ALGERIA.

Pseudocytisus integrifolius and *P. spinosus* are occasionally cultivated in botanic gardens. The former was according to Miller[4] and Aiton[5] cultivated about 1759 in England but of the latter I have no knowledge of its being in cultivation until 1893, when I saw and collected it in the Botanic Garden at Goettingen where it had been received from the Botanic Garden at Innsbruck. These shrubs demand a sunny position in the rock garden and form dense bushes covered from the middle of May to the

[1] Syst. Pl. II. 639, 641.
[2] Fam. Pl. 421 (1763).
[3] in Post & Kuntze, Lexic. 464.
[4] Gard. Dict. ed. 7 (1759).
[5] Hort. Kew. II. 370 (1789).

beginning of June with yellow flowers, as photographs of handsome plants in the Botanic Garden at Darmstadt published by J. A. Purpus show.[1]

Vella Linnaeus

Vella Linnaeus Hort. Cliff. 329 (1737); Gen. Pl. ed. 2, 317 (1742); ed. 5, 289 (1754), pro parte.
Carrichtera Adanson, Fam. Pl. 421 (1763), pro parte.—De Candolle, Syst. II. 641 (1821).

Vella annua Linnaeus, Spec. 641 (1753).
Carrichtera Vellae De Candolle, Syst. II. 642 (1821).
Carrichtera annua Prantl in Engler & Prantl, Nat. Pflanzenfam. III. abt. 2, 173 (1891).

MEDITERRANEAN REGION.

ON NUTTALL'S TRAIL THROUGH ARKANSAS

ERNEST J. PALMER

We in America are passing through what might be termed an era of commemorative anniversaries: Centennials, sesqui-centennials, semi-centennials and tercentenaries of historical events and of personages more or less renowned in the annals of statesmanship, war, art, literature or science are following each other in bewildering array and are finding concrete expression in efforts ranging in ambition from world expositions, pageants and commemorative postage stamps, to the unveiling of busts, the partaking of banquets and the launching and reviewing of fleets of laudatory oratory and scripture by individual or grouped admirers and disciples.

It is in part the object of this paper to enter a modest skiff amongst these more pretentious craft by calling a rather tardy attention to the centenary of an event of no slight importance in the early scientific exploration of a part of the country in which I have of late been interested, an event which in view of the time and circumstances, must be ranked amongst the most courageous enterprises of its kind in the early nineteenth century, and which certainly seems to be deserving at this time of at least a passing tribute of praise.

It is now a little more than one hundred years since Thomas Nuttall, the English naturalist, set out from Philadelphia on his remarkable scientific pilgrimage to visit the then little known Territory of Arkansas. Traveling by stage to Lancaster, he proceeded thence on foot to Pittsburgh, a distance of 280 miles as now reckoned by rail, where, having purchased a light skiff and supplies, he embarked on October 21st, 1818, on the Ohio River and began his voyage down that stream and the Mississippi to the junction of the Arkansas and White Rivers with the Mississippi. From there, subsequently, he worked his way laboriously

[1] in Gartenfl. LXXV. 436, 437 (1926).

up the Arkansas River, and after encountering many dangers and difficulties, arrived early in the spring of 1819 at the frontier military post of Belle Point, later called Fort Smith, and the site of the present flourishing city of that name. After spending some time at the garrison, exploring the surrounding country and making several extensive excursions into what is now the state of Oklahoma, he proceeded by river to New Orleans and thence returned to his starting point, which he reached after an absence of nearly a year and a half.

The record of his travels published in Philadelphia in 1821: "A Journal of travels into the Arkansa Territory during the year 1819," being the earliest account written by a competent observer of that part of the country, is not only a work of considerable scientific and historical value, but is one that can scarcely fail to interest any intelligent reader, as a simple narrative of adventure and a faithful picture of pioneer life and conditions amongst the early white settlers.

On the scientific side the author records his observations on the geography and geology of the country through which he passed, with notes on the customs, traditions and prehistoric remains of the various Indian tribes, and more particularly accounts of the plants, birds and other forms of wild life which he encountered. His investigation of the flora of the region, which was the primary object of the journey, led to the discovery of many plants previously unknown to scientists, and his subsequently published descriptions of these and others collected in various parts of the country deservedly secured for him an honorable recognition in the scientific world, and have made his name familiar to all students of American botany.

We who today pass over the route followed by Nuttall accomplishing the distance in a few hours with the comparative comforts of modern travel, and view from the windows of the speeding train great industrial cities and highly cultivated farm lands bordering the majestic rivers, can scarcely appreciate the magnitude and difficulties of such a journey a century ago. And while changes have been less marked and conditions still remain comparatively primitive in some of the more remote sections penetrated by him, yet even there the dangers and inconveniences of travel have been largely overcome, and accommodations at which the modern traveler might be prone to cavil would have been considered almost luxurious at that early day. The great rivers were then the only highways of commerce, and travel upon them was slow and uncertain. Steamboats were beginning to ply on the lower Ohio and Mississippi rivers, and farther up when the stage of water permitted, and in their downward course traders, trappers and many emigrants with their merchandise, household possessions and stock, bound for the new lands to the west and south, floated slowly with the current on a motley fleet of rafts, flat-boats, skiffs and arks, several of the smaller craft often lashed together for greater safety and to secure a wider sweep of the

current. Such traffic as went up stream made laborious headway against currents and such other obstacles as shallows, sand bars and the sunken rocks and logs that often obstructed the channels.

Back from the rivers and larger towns and in the more recently settled districts, there were no stage lines, bridges nor roads beyond mere trails through the forests and prairies, no places of public entertainment nor facilities for securing anything but the most primitive accommodations or supplies. The houses of the settlers, for the most part one and two roomed cabins, often domiciling large families which were then in vogue, were frequently miles apart.

The Territory of Arkansas had but recently been organized; settlements were few and mostly confined to the borders of the navigable rivers, many of the sites being malarious and surrounded by swamps. Indians of various tribes, most of them more or less hostile or restless, formed a large part of the population of the territory. These, and the wild animals that abounded were, however, often less dangerous than the renegado whites, who as fugitives from justice or outcasts from the restraints of more settled society sought in the wilderness a wider field for their lawless depredations. Title to much of the land was in dispute, both on account of Indian claims and those based upon earlier grants by the French and Spanish governments. This circumstance, in addition to the natural difficulties of pioneer enterprise in a section remote from travel and civilization, naturally tended to retard settlement and to render living conditions most precarious and primitive.

It was under these conditions, into this untamed wilderness and nascent society, that Thomas Nuttall set out without companion or guide, with meager equipment and resources, and armed only with a few letters of introduction from friends in Philadelphia to citizens and military authorities in the new territory.

The account of this journey that Nuttall has left us is, as its title implies, in the form of a journal or notes written from day to day. It has the merit, as the author modestly and somewhat apologetically explains in the preface, of being free from the literary embellishments often affected by the writers of the time, and he also assures us that in publishing it he has no intention of appealing to the fastidious tastes of the casual or merely curious reader. But although the writer was concerned chiefly with the scientific aspect of the country through which he passed, he by no means confined himself to such matters, and the narrative abounds in incidents and observations of the most varied character, and is not devoid of colorful passages and human interest. Interspersed with his account of daily happenings and descriptions of the country and its natural history and of the ethnology, folklore and antiquities of the Indians, are observations and comments on subjects ranging from the cost of commodities, and the quality and value of crops, cattle and farm lands, to incidents portraying pioneer life and Indian traits. Sometimes

also the author is led into poetic flights, inspired by the beauties of nature as revealed in the changing landscape or the unfolding season, or into philosophic digressions on the frailties of human nature, called forth by the avarice or sordidness of people he encounters or by the general ignorance and thriftlessness of portions of the population. Some of the author's remarks are shrewd and amusing, and at times there is a touch of pathos as we sense the scarcely concealed distress that his sensitive nature must have experienced in its contact with the rough world of men with which he was by temperament so little fitted to cope.

Rare courage and devotion to science were surely needed to induce such a man to undertake and carry out a journey like that he records. On one occasion he relates how he was imposed upon by boatmen who pretending to free his stranded boat, left it in the dark upon the other end of the mud bar in order to extort a further charge. Later, having sold his boat upon entering the Arkansas River, he made application to some land speculators who were going up the river, for a passage with them, only to be refused except on the condition that he should furnish his own supplies and work as a common laborer. He comments rather bitterly and justly on their ignorance and lack of appreciation of scientific effort. On several occasions he complains that men whom he had hired or given passage refused, through insolence or indolence, to perform their duties, and he was compelled to wait their drunken whims or himself plunge into the icy water to guide or propel the boat, and once to watch under arms all night to prevent its being stolen by a rascally employee. At another time his horse was seized by a vagrant Osage Indian, and on the advice of a trader companion familiar with the revengeful character of the marauder, he was constrained to make the culprit a present in order to recover his property instead of meeting out deserved punishment. On various occasions he deplores the drunken and dissolute character of the companions with whom he was compelled to travel or lodge, and once he mentions his mortification at the ostracism he encountered because of his refusal to take part in the drinking and gambling excesses of his host and fellow guests at a frontier tavern.

After entering the Arkansas River he experienced great difficulty in getting his boat up to the settlement at Arkansas Post. He tells us how this was effected with the aid of two French boatmen and a Negro whom he had hired. Compelled himself at times to wade waist deep in the water and sinking into the mud at every step in order to avoid capsizing the boat, he thus comments on the incident: "In the meanest garb of a working boatman and unattended by a single slave I was no doubt considered, as I had probably been by the land speculators, one of the canaille; my thoughts centered upon other objects, and all pride of appearance I willingly sacrificed to promote with frugality and industry the object of my mission."

But if the conditions and incidents of travel were often trying, he found,

as he frequently indicates, full compensation in contemplating the beauties of nature and in the fruitful pursuit of science. In describing the passage up the Arkansas and the country subsequently explored, the dominant note is one of enthusiastic delight; and the varying landscape, the bold facades of bluff and mountain, the majestic sweeps of the river, the gloom and silence of the primeval forest or the morning chorus of the birds and the multi-colored floral covering of the vernal prairies sometimes inspire him to passages of poetic fervor. He thus describes the prairies of the Cretaceous limestone areas bordering Red River, which he saw for the first time while accompanying a military party from the garrison at Fort Smith:

"These vast plains, beautiful almost as the fancied Elysium, were now enamelled with innumerable flowers, amongst the most splendid of which were the azure Larkspur, gilded Coreopsides, Rudbeckias, fragrant Phloxes and purple Psilotria; serene and charming as the blissful regions of fancy, nothing here appears to exist but what contributes to harmony." In striking contrast was the impression made upon him, which he earlier records, by the dense forests of the extensive flood plains near the mouth of the Arkansas and along the Mississippi River:

"How many ages," he is moved to exclaim, "must elapse before these luxuriant wilds of the Mississippi can enumerate a population equal to the Tartarian desert! At present all is irksome silence and gloomy solitude, such as to inspire the mind with horror." In this forecast, he was of course misled, like many of his contemporaries, through lack of prevision of the changes destined to be wrought through modern transportation.

As a historical document the Journal of Nuttall is of considerable value on account of its accurate descriptions of many of the early settlements, and notes on the economic development of the territory and the social conditions prevailing amongst the pioneers and the native tribes with whom they were in contact. Pittsburgh was already a bustling industrial city; Wheeling he describes as "consisting of a tolerably compact street of brick houses, with the usual accompaniment of stores, taverns and mechanics." At Cincinnati, which he considers to be "by far the most agreeable and flourishing of all the western towns," he mentions the fact that a medical college was about to be opened, but he regards such enterprises as rather premature. In his descent of the Ohio and Mississippi rivers we get glimpses of settlers' cabins and clearings and occasional settlements and towns, some of which have since grown to importance while others have disappeared or have assumed other names. Louisville is described as a flourishing town, in spite of the depreciated Kentucky bank-note currency, of which he says: "A more ruinous and fraudulent system of exchange was never devised in any Christian country." Troy, Ohio, he designates as "a miserable handful of cabins dignified by this venerable name," Owensville, (Owensborough,

Kentucky) "another insignificant cluster of log cabins, and the seat of a county," Shawneetown, "a handfull of log cabins with some of them shingled." He also refers incidentally to passing a small town called Evansville; and New Madrid is "an insignificant French hamlet of little more than twenty log houses and stores, miserably supplied." After passing Marietta, Ohio, he remarks: "We scarcely, indeed, see anything in this quarter but the miserable log cabins of tenants so poor and ill provided even with the common necessities of life, that had we not taken the precaution of providing ourselves with provisions, we must often have had to fast or sit down to nothing better than mush and milk." In commenting on the extortionate charges demanded from travelers at one settlement on the Mississippi, he introduces a list of prices, which includes such items as lead for bullets eighteen cents per pound, butter thirty-seven and a half cents, pork six dollars per hundred, beef five, and whisky one dollar and a quarter per gallon. Needless to say, this was in a day when the last-named article was a commodity and not a political issue.

Such settlements as existed in the new territory of Arkansas were mostly along the banks of the river. Arkansas Post, the territorial capital and chief commercial center, had been established at an early period in the history of the country by French trappers and traders. After a century of existence, Nuttall tells us, it contained at the time of his visit between twenty and thirty houses and three stores, and was destitute of even a hatter, a shoe-maker or a tailor. A few families were settled on both sides of the river at the "Little Rock" so called from an outcrop of stratified silicious rock, the first encountered in ascending the river. There was as yet, however, no town at the site of the present state capital and nothing to indicate its destined importance as a commercial and political metropolis. Amongst other embryonic settlements mentioned are those at the Cadron, Dardanelle, and one at the mouth of Pecan Creek. But most of these were merely projected towns, consisting of only a few houses grouped together for mutual protection and convenience, in addition to the ambitious projects of town agents and land speculators.

Nuttall, however, while noting and recording all of these facts and impressions on various subjects, which add interest to his Journal, never for long loses sight of the real object of his enterprise, which was the study of the ethnology of the various Indian tribes, and of the geology, fauna and flora of the Arkansas Territory. And it is of course with the last subject that we are chiefly concerned in this paper.

As it has been my fortune to travel at various times over most of the route first blazed to science by this early naturalist, I have followed the account of his journey and the description of the country as he then saw it, with the greatest interest. And often it has been the source of much pleasure to realize that I was perhaps standing upon the very spot from

which he viewed and sketched some striking feature of the landscape, or from which he secured the type specimens of certain plants which he later described. Not less interesting has been the opportunity afforded for comparing the present condition of the country, both as regards the state of civilization and of nature, with that he described a century ago. Changes in the former respect have of course been very great, but as regards the aspect of nature and the wild life, or at least the flora, they are in many places, fortunately, very slight.

With greater leisure and the better facilities of modern travel it has also been possible to explore more thoroughly some of the places which Nuttall in his hasty journey could but touch upon or view from a distance. And therefore in addition to a brief review of Nuttall's journey and Journal, it is my purpose to describe somewhat more particularly the flora of a few of the more interesting localities along the route he followed.

Beginning with the leisurely stage of his journey, from Lancaster to Pittsburgh, which he accomplished on foot, and throughout the long passage down the Ohio and Mississippi rivers, the latter occupying him from October 21st, 1818 to January 12th, 1819, Nuttall introduces into his journal observations on the character of the vegetation and notes on particular trees and other plants of interest; it will be necessary to mention only a few of them here.

Near Steubenville, Ohio, he records seeing the Mistletoe for the first time on the journey, and near the mouth of the Big Sandy River, which forms the boundary between West Virginia and Kentucky, he first observed the Cane (*Arundinaria macrosperma*). Near Owensborough, Kentucky, Cane began to be tall and abundant, and there also he found *Forestiera acuminata* growing. Below Fort Massac, on the present site of the town of Metropolis, Illinois, he mentions finding the One-seeded Honey Locust (*Gleditsia aquatica*) and the pubescent southern variety of the Button-bush (*Cephalanthus occidentalis* var. *pubescens*). Both are still to be found at this place, and had Nuttall been able to explore the vicinity a little farther he might also have found many other interesting plants, such as the Swamp Hickory (*Carya aquatica*), Willow Oak (*Quercus Phellos*) and the Silverbell Tree (*Halesia carolina*).

Between Shawneetown and the present site of Golconda occurs some of the most picturesque scenery on the Ohio River, fully justifying its Indian name, said to signify "The Beautiful". Nuttall did not fail to appreciate this and comment upon the wide and magnificent vistas of the river, checkered with many islands, and upon the bold cliffs and promontories near Battery Rock and Cave in Rock. Of the country bordering the river in this vicinity he says: "The occidental wilderness appears here to maintain its primeval solitude; its gloomy forests are yet unbroken by the hand of man, they are only penetrated by the wandering hunter and the roaming savage."

At the junction of the two great rivers, where now stands the important

town of Cairo, at the southern extremity of Illinois, he tells us: "The whole country here, on both sides of the Mississippi and the Ohio, remains uninhabited in consequence of inundation, and abounds with various kinds of game, but particularly deer and bear, turkeys, geese and swans, with hosts of other aquatic fowls, though with the exception of the white pelican, they are such as commonly exist in many parts of the Union."

Nuttall and his party were constrained to remain here, camping on the Kentucky side, for a day or two on account of the floating ice on the Mississippi, the season being mid-December. He states that the river banks above the point where they had landed were surmounted with an almost impenetrable sempervirent cane brake, some of the canes measuring upwards of 30 feet. Here also they continued to observe the Coffee-bean (*Gymnocladus dioica*), of which he says: "The seeds when parched are agreeable to eat, but produce a substitute for coffee inferior to the *Cichorium*."

In the vicinity of New Madrid he saw abundant signs of the recent earthquakes, in the form of inundated forests and sunken lands, and he says that earth tremors were still prevalent, two or three sometimes occurring in a day. Here he saw the Catalpa (*Catalpa speciosa*) apparently indigenous in the forest. Trees of this species, attaining a large size, were formerly abundant in southern Illinois, and although it has been severely cut for posts and fuel, it is still frequently met with there and along Crowley's Ridge in southeastern Missouri and northeastern Arkansas. However, nowhere in its range have I seen it growing as a pure stand or forming a large part of the forest, and in most places there seems to be some doubt as to whether it is really native or a recent introduction.

Commenting on the forest growth near the mouth of the St. Francis River, the author mentions his disappointment at finding it so similar in composition to that of the middle and northern states. The upland forest, he says, consisted largely of Black Ash, Elm (*Ulmus americana*), Hickory, Walnut, Maple, Hackberry (*Celtis integrifolia*), Honey Locust, Coffee-bean, &c. Buttonwood and enormous Cottonwood trees, some of the latter more than six feet in diameter, were growing on the banks; and he also saw here the Holly (*Ilex opaca*), and the Mistletoe, which was abundant on all of the smooth-barked trees. These huge Cottonwoods, he says, were commonly called Yellow Poplar, and he gives them the botanical name of *Populus angulisans* (probably *Populus angulata* Aiton, which is not now regarded as distinct from *P. balsamifera* L.). The tree he called Black Ash was not *Fraxinus nigra* of the northern forests, and he may have mistaken a form of the White Ash (*F. americana*) or more likely the Pumpkin Ash (*F. profunda*), for it. *Celtis integrifolia* Lamarck is a synonym of *C. laevigata* Willdenow, the common lowland Hackberry of the region.

On landing at a point some miles farther down, and probably near or opposite the present town of Helena, Arkansas, he found the woods almost impenetrable from the entangling growth of Smilax, Supple-jack and *Brunnichia cirrhosa*. Here, he tells us, he for the first time recognized the Short-podded Honey Locust (*Gleditsia brachycarpa*), "A distinct species intermediate with the common kind (*G. triacanthos*) and the One-seeded Locust (*G. monosperma*), differing from *G. triacanthos* in the persistent fasciculated legumes, as well as in their shortness and want of pulp." This tree has since been found at a number of places, generally growing in close proximity to the two other species mentioned by Nuttall, and it is now regarded as being a hybrid between them, and is known under the name *Gleditsia texana* Sargent.

Nuttall reached the mouth of the White and Arkansas rivers, which enter the Mississippi at the same point, on January 14th. And here his real work of exploring the flora of the Territory of Arkansas began.

At this early season, he says, the weather was already mild and spring-like, and the common Butterweed (*Senecio glabellus*) showed signs of flowering. In the neighboring woods he was shown a scandent woody shrub that, he says, proved to be the Carolina Kidney-bean Tree, and which he named *Wistaria speciosa*. He remarks that the branches were so supple that a knot could be tied in them with ease, and that they were often used for ropes or boat cables. This plant is now known by the older name *Wistaria macrostachya*.

While detained near the mouth of the Arkansas River, Nuttall explored the low woods along the banks, and he gives a list of some of the plants. Amongst trees and shrubs which he mentions here are the following: Pecan, Swamp Hickory (*Carya aquatica*), Black Walnut, Blue Ash (*Fraxinus quadrangulata*), Sycamore, Hackberry (*Celtis integrifolia*, or as now known *C. laevigata*), Swamp Oak (*Quercus aquatica*, now called *Q. nigra*), Red Oak (*Q. rubra*), Scarlet Oak (*Q. coccinea*), Spanish Oak (*Q. falcata*), Cottonwood (*Populus angulisans*, the identity of which was mentioned above), Smaller White Poplar (*P. monilifera*, now identified with *Populus balsamifera*, as described by Linnaeus, and only an immature form of the trees he first mentions), Common Honey Locust (*Gleditsia triacanthos*), One-seeded Honey Locust (*G. aquatica*) and the Short-podded Honey Locust (*G. brachycarpa*). The Oak which he called *Quercus rubra* was probably not the Northern Red Oak, now known as *Q. borealis* var. *maxima*, but its southern ally *Q. Shumardii* Buckley, while the Spanish Oak is the species now known to have been first described by Linnaeus as *Quercus rubra*. The tree called by Nuttall in this list *Quercus coccinea* can not have been that species, as it is not an inhabitant of low alluvial woods and is not known to occur in that region. There are but three Oaks found in low woods along the Arkansas River which might with any likelihood be confused with *Quercus coccinea*. The first of these is *Quercus Shumardii*, which bears

a much closer resemblence to *Q. borealis* var. *maxima*, for which Nuttall, like all of the early collectors, seems to have taken it. The second is the Pin Oak (*Quercus palustris* Muench.), which is quite uncommon so far south, although it has been found in the Arkansas River bottoms near Little Rock. This tree, however, has a different habit of growth as well as an entirely different habitat from the Scarlet Oak, and the small different-shaped fruit serves to distinguish it unmistakably from the latter species. The third Red Oak of the low alluvial bottom lands is a tree that has long puzzled collectors, and specimens have been distributed under various names, as *Quercus texana*, *Q. Shumardii* var. *Schneckii*, *Q. coccinea*, *Q. ellipsoidalis* and *Q. palustris*. When I first saw this tree in Natchitoches and Ouachita Parishes, Louisiana, in 1915, I was inclined to refer it to *Quercus ellipsodalis* on the strength of published descriptions and figures of that species, which I had not at that time seen growing. Of course geographical considerations made this very improbable, and a closer acquaintance with the character and habits of the so-called Jack Oak of the Lake Michigan region put it quite out of the question. It is interesting, however, to find that others have hazarded the same opinion as to its identity, as will be seen by referring to the list of specimens at the end of this article. In foliage and habit of growth, trees of this species appear to resemble most nearly *Quercus palustris*, and forms of it might easily be mistaken for that species, when found without fruit, as has sometimes been done. Typical leaves are, however, larger and of a distinctly different shape from those of the Pin Oak and resemble even less those of the Scarlet Oak, but certain forms of all these species approach each other in this respect. But it is mainly on account of the shape and character of the acorns that it has been confused with *Quercus coccinea* as well as with *Q. Shumardii* var. *Schneckii*. It is well distinguished in its fruit, however, from either of these species or from any other Oak.

It is an interesting coincidence to find that this long-neglected Oak was again collected at Arkansas Post, probably near the very spot where Nuttall found it and almost one hundred years after his visit, by Mr. J. H. Kellogg. I am quite convinced that it is a well-distinguished species, not referable to any hitherto described, and a description will be found at the end of this article, under the name of *Quercus Nuttallii*, in honor of the distinguished naturalist who first collected it.

In crossing a swamp near the town of Arkansas Post Nuttall also notes some of the trees. Here, he says, the principal species were *Quercus lyrata*, *Q. macrocarpa*, *Q. Phellos*, *Q. falcata* and *Q. palustris*, with some Red and Scarlet, as well as Black and Post Oak on the knolls or more elevated parts. He also mentions observing in this swamp, *Nyssa aquatica*, *N. pubescens*, *N. biflora* and *Gleditsia monosperma*. He remarks that the fruit of *Nyssa pubescens*, the Ogechee Lime, was prepared as a conserve. About two miles back of the town he visited a lake, from

which, he tells us, a vast prairie opened to view, extending to the north and west, and computed to be not less than 30 leagues in length, by 10 to 15 in breadth. In the alluvial forest between the prairie and the river, where the growth consisted largely of Oak, Hickory, Box-elder and Elm, with Cottonwoods along the river banks, he found a large specimen of *Zanthorylum Clava-Herculis*, as large, he says, as an ordinary Ash. On March first he found the Red-bud (*Cercis canadensis*) commonly in flower, and on the thirteenth a vine called the June Grape (*Vitis vulpina*) was coming into bloom. On March 21st, however, he records that for several nights there had been frosts of sufficient severity to destroy most of the early Grape, Plum, Paw-paw and Red-bud blossoms, as well as to do great damage to crops. These sudden fluctuations in temperature at the spring season, from summer heat to severe frosts, the thermometer registering only 22 above zero Fahrenheit, as recorded by Nuttall, is one of the principal inhibiting factors against the northward extension of many of the coastal plants, and as he clearly recognized, it largely accounts for the general floristic similarity of the forests in this comparatively low latitude, to those of the states several degrees farther north. Nuttall, in this connection, expresses surprise at the absence of the usual evergreens, Magnolias, Rhododendrons and other plants of the Heath family.

At a point along the river, probably not far from the present town of Pine Bluff, he records finding *Fraxinus sambucifolia* and *F. platycarpa*. The former was perhaps, as before suggested, *F. profunda*, and the latter is now known under the name of *F. caroliniana* Mill. Some distance farther up the river he mentions seeing *Ilex opaca*, conspicuous for the first time along the banks, and, on lands contiguous to the river, thickets of the Chicasaw Plum (*Prunus angustifolia*) were apparently overgrowing the sites of former Indian villages. Above the Little Rock, the Red Cedar (*Juniperus virginiana*) began to appear, with tufts of ferns, along the shelving rocky bluffs. Here he came in sight of a remarkable conical hill, resembling in the distance the cone of a volcano. This conspicuous landmark remained in sight for several days on their slow passage up the river, and Nuttall mentions it more than once. He also made sketches of it as it appeared from two different points, which were reproduced as woodcuts in the Journal of Travels, printed at Philadelphia. This curious hill is called the Maumelle Pinnacle, (or as Nuttall spells it Mamelle) and it is flanked by several lesser elevations called the Little Maumelles. Nuttall ascended one of the latter and from it made a sketch of the higher peak. He says of it:

"To the west, the lofty conic and broken hill called the Mamelle now appeared nearly double the elevation of that on which I stood, probably more than 1000 feet in height. Two miles above it presents the appearance of a vast pyramid, hiding its summit in the clouds."

This description, and the figures showing the great Maumelle, rising

like a narrow-based pyramid from the plain, were so remarkable and so unlike anything I had seen in the region, that I had long been anxious to visit the locality. This opportunity came in May, 1923, when in company with Rev. H. E. Wheeler of Little Rock I spent a day in climbing and exploring these curious hills. The group or range of peaks lies only a short distance back from the Arkansas River, and the distance from Little Rock in a direct line up the river is about fourteen miles. A branch of the Rock Island railway now passes near the base of the mountain, and it is only a mile or two distant from the station of Pinnacle. The mountain or series of peaks really consists of a short serrated ridge, formed by the upturned and almost vertical strata of sandstone of various degrees of hardness and thickness. The axis or crest runs nearly east and west, its eastern end forming a bluff along the Arkansas River, and rising gradually westward until it terminates in the Great Maumelle or Pinnacle, the summit of which is 1250 feet above sea level, or about 1000 feet above the river valley. Some of the lesser hills are formed by parallel ridges. To the north of these hills runs the Maumelle River and along the southern flank the Little Maumelle River or Creek.

Crossing the valley of the smaller stream we approached the mountain, which viewed from this side, although quite striking, is in comparison with Nuttall's figures, rather disappointing. The broken rocky ground sloping gently toward the base of the mountain is covered with a forest of small trees, consisting chiefly of Pine (*Pinus echinata*), Mocker-nut (*Carya alba*), Arkansas Hickory (*C. Buckleyi* var. *arkansana*), White, Black and Post Oak and Winged Elm (*Ulmus alata*). *Ceanothus americanus* and a yellow-flowered *Baptisia*, both in flower at the time of our visit (June 1st), were conspicuous in the rocky woods and for some distance up the mountain-side. We began climbing the peak on the east side, but soon finding it too precipitous we were compelled to work around well towards the northwest before we succeeded in scaling to the top.

From the summit a fine panoramic view of the surrounding country can be had on a clear day: to the west and south lie range beyond range of wooded hills, until their outlines are lost in the purple distance, and to the north and east is seen the winding Arkansas River, with its wide valley still heavily timbered with Cypress and deciduous trees, except where it has been cleared for agricultural use, and beyond this rise other ranges of hills. The city of Little Rock is also in plain view, if the day is clear, besides several other towns and villages.

Trees and shrubs of numerous species common to the region extend up the east and north slopes, where these are not too precipitous, quite to the top of the mountain. Most of the trees are of stunted appearance, increasingly so towards the summit and on the exposed slopes. Amongst the more common species are *Pinus echinata*, *Carya Buckleyi* var. *arkansana*, *Castanea ozarkensis*, *Quercus borealis* var. *maxima*, *Q. velutina*,

Q. alba, *Q. stellata* and *Vaccinium arboreum*. Less commonly are found the Black Locust (*Robinia Pseudoacacia*), Red-bud (*Cercis canadensis*), Hop Hornbeam (*Ostrya virginiana*), the two shrubby Huckleberries (*Vaccinium stamineum* and *V. vacillans*) and the Post Oak Grape (*Vitis Linsecomii* var. *glauca*), most of them extending well up the mountain-side. The Ozark Chinquapin is very abundant on some of the talus slopes. At the time of our visit it was in flower and was very conspicuous on account of the abundance of the long racemose blossoms with a rather disagreeable fetid odor. Some specimens were of large size, perhaps 12 to 15 meters tall, and with a much wider spread of branches. Though arborescent in size it usually divides into several trunks from the base, as it grows at this place. On the rocky ledges the Woolly Lip Fern (*Cheilanthes tomentosa*) was frequent in clefts, and in more open situations the handsome purple-flowered Crucifer *Streptanthus maculatus*, first discovered by Nuttall in this vicinity, was abundant and conspicuous.

Several springs issue near the base on the north side, forming rivulets which find their way into the Maumelle River. At one of these we had lunch, and found the water to be cool and pure, filtered as it is through the sand. *Smilax rotundifolia*, *Vaccinium corymbosum*, *V. virgatum*, *Xolisma ligustrina*, and *X. mariana* were growing along the small stream formed by the spring. And lower down where it spreads out into a little bog, Sweet Gum, Ironwood (*Carpinus caroliniana*), Black Willow and the trident-leaved variety of the Red Maple (*Acer rubrum* var. *tridens*) were common, with the Royal and Cinnamon Ferns, Devil's-bit (*Chamaelirium luteum*) and the little Orchid *Microstylis unifolia* growing beneath them.

A view of the Pinnacle which we had from the north, and probably in line with the point from which Nuttall made his second sketch farther up the river, showed the peak formed by the crest of the narrow ridge of upturned strata, and more nearly resembling the figure of the Journal.

Remarkable as is the structure and appearance of these peaks, there is not much in the character of the flora to distinguish it from that of the surrounding region, and it is much less interesting than that of some of the other mountains. This is probably due to the limited extent and exposed position of the peaks, affording little protection to peculiar or extra-limital species such as have survived in more favored situations.

Some thirty of forty miles up the Arkansas River, Cadron Creek enters it on the north side. Nuttall visited the settlement and projected town site at this point and made it the subject of a sketch that appears in the Journal. As surmised by him, no permanent town was established here.

Cadron Creek flows out of a high and picturesque country, and a few miles above its mouth it is joined by Cove Creek. For several miles the two streams flow parallel, separated only by a narrow rocky tongue of land. The flora, especially along the high bluffs of Cove Creek, is extremely rich and interesting. In the autumn of 1924, accompanied by

Professor Delzie Demaree, of Conway, who had explored the locality rather thoroughly and found many rare plants, I paid a hurried visit to it, and saw *Ilex verticillata*, *Hypericum oklahomense*, *Gelsemium sempervirens* and *Viburnum dentatum* for the first time in Arkansas. In alluvial bottoms near the mouth of the creek the Nutmeg Hickory (*Carya myristicaeformis*), the King-nut or Large Shell-bark Hickory (*C. laciniosa*) and the Cedar Elm (*Ulmus crassifolia*) are also found.

Some miles below the mouth of the Petit Jean River Nuttall ascended a high rocky ridge that he estimates to be six or seven hundred feet above the level of the Arkansas River. He gives a faithful and familiar picture of the scenery: "a vast wilderness covered with trees and checkered with ranges of mountains." The Maumelle peak was still in sight, although, as he says, at the lowest estimate, forty miles distant. "Over the vast plain immediately below me," he continues, "appeared here and there belts of Cypress, conspicuous by their brown tops and horizontal branches; they seem to occupy lagoons and swamps at some remote period formed by the river." Some of these Cypress swamps are still conspicuous features of the landscape in the vicinity of Morrilton, in spite of nearly a century of lumbering operations and extensive drainage. On the shelving rocks of the mountain from which these observations were made, he records finding a new species of *Anemone* (*A. heterophylla*). A day or two later he inserts a note that "The insects which injure the Morel Cherry-trees in Pennsylvania, I perceive here occasionally act in the same way upon the branches of the wild Cherry (*Prunus Virginiana*)." Since this species does not occur in the region, nor anywhere near the state of Arkansas so far as is now known, Nuttall must have mistaken shrubby specimens of *Prunus serotina* for it.

At the Dardanelle rocks, where the river cuts through beds of massive sandstone tilted at a low angle and presenting on the south a very singular and bold facade, there was a considerable settlement of partially civilized Cherokee Indians at the time of Nuttall's visit. The traders' boat in which he was traveling stopped for some time to barter with the natives, and Nuttall improved the time both by interviews with the latter, from whom he learned something about their language, customs and traditions, and also by botanical excursions in various directions, including a climb to the highest points of the cliffs on either side. On the south slopes the Flowering Dogwood (*Cornus florida*), Violets and a parti-colored Collinsia (*Collinsia violacea*) were already in bloom, the date being April seventh. The town of Dardanelle now occupies the level land on the south side, just above the rocky headlands. The river at this point was, at the time I visited it in 1924, spanned by a pontoon bridge, one of the longest remaining in the country. It has since, I believe, been replaced by a more substantial if less picturesque structure. A few miles to the south and west lies Mount Nebo, a very striking and considerable mountain, with an area of several square miles of level land

at its summit. A fairly good automobile road has been constructed to the top, which is occupied by the cottages of many summer tourists and some permanent residents. The massive sandstone strata which form the cap rock of the mountain are nearly horizontal or only slightly tilted, and the slopes at many points, subject to rapid erosion, are steep or precipitous. There is some fine timber on the more gradual slopes, consisting largely of Short-leaved Pine (*Pinus echinata*), White, Black and Red Oak, Sweet and Black Gum and several species of Hickory, with a smaller proportion of many other species. Mount Nebo was doubtless one of the mountains viewed by Nuttall from the top of the Dardanelle cliffs, as it is a prominent feature of the landscape there. From that point also, he could still discern the Maumelle peak, although he estimated it to be not less than one hundred miles distant by river and sixty in a direct line. It may have been from this eminence also that he drew the sketch of Magazine Mountain from which was made the woodcut inserted in the Journal. He conservatively estimated the height of this "magnificent empurpled mountain" to be not less than 1200 feet and the distance ten miles. As a matter of fact its base was more than twenty miles from where he stood and the top of the mountain is elevated more than 2000 feet above the surrounding valley.

Magazine Mountain, situated about fifteen miles south of the Arkansas River, is the highest and largest of the mountains of southern Arkansas, and indeed it is easily the most striking feature of the mid-continent elevation. Both on account of its magnitude and its comparative isolation from other peaks, its clear-cut outline is, under favorable atmospheric conditions, an impressive and familiar landmark for many miles in all directions. Viewed in outline against the sky-line from either the north or south side, the homely name given it by the early French hunters, from its supposed resemblence to a barn, seems not inappropriate, however much we might wish that it had received a more dignified or poetic designation. As seen from the south, the direction from which it is now most easily approached and from which most of my ascents were made, the platform or plateau that forms its summit appears as a ong line inclined very slightly towards the east for some distance and then falling away more suddenly towards the plain. On the west side there is an extension or lower platform of about two thirds the height of the main elevation. On nearer approach it is seen that the slopes are heavily wooded and dissected along the lower levels by many ravines and chasms. A bold facade of nearly naked cliffs stands out along the margin of the plateau, the summit of which is occupied by a smaller growth of timber.

Like all the mountains of this region, Magazine Mountain is composed of the massive sandstone strata alternating with softer beds of shale and clay, all of the Pennsylvanian series. The structure of the mountain is that of a gentle syncline, the strata being so slightly inclined as to

generally appear horizontal when seen outcropping along the slopes. The surrounding country, however, was subjected to extensive disturbances which left the strata standing at high angles or even perpendicular in many places, but a small area, of which the truncated top of Magazine Mountain is now the remnant, appears to have escaped and to have remained as an island in the general sea of disturbance. This was probably due in part at least to the fact that there was at this point a local thickening in the massive beds of sandstone which now form the cap-rock of the plateau, and which may have been deposited in an estuary along the coast of the old Paleozoic sea. If this hypothesis is correct, the little-disturbed area now represented by the summit of Magazine Mountain probably remained, after the Cretaceous upheaval, as a depression below the general level of the surrounding area with its broken and upturned strata; and its present relative elevation is due to the fact that it has been more resistant to the erosive forces operating through the long subsequent ages, which have broken down and removed thousands of feet of the more vulnerable upturned and unprotected layers.

The plateau which forms the top of the mountain is at present about seven miles in length and from less than half to three quarters of a mile in breadth. It was doubtless formerly much larger, and erosion is now reducing it very rapidly. This can be well seen along the high perpendicular cliffs that form its rim, at the bases of which huge piles of talus have accumulated, which are augmented every year by the toll taken by every storm.

A trail or rough road, practicable only for horses or light vehicles, has been constructed from the village of Blue Mountain, near its southern base, to the top of the mountain. A small hotel for the convenience of summer tourists was until recently operated on the top, near the west end, and a number of cottages are occupied transiently. At one time a number of farms were cleared on the central and eastern part of the plateau, and fairly commodious houses, barns and other outbuildings, now for some years falling to decay, and the partially overgrown remnants of fields and orchards, attest this former occupancy. The difficulties of transportation and communication with the rest of the world proved, however, too great a handicap in the estimation of a younger and more exacting generation, and there were at the time of my visits only a very few families residing on the mountain. The development of a summer resort and a modern hotel have been projected for some time, and doubtless this scheme will be carried out in the near future, as few places if any in the Middle West or South offer such attractions in scenic beauty and climate, were it once made accessible through the construction of a practical roadway.

The slopes and top of the mountain were once all heavily forested; and although the timber has been thinned and the best of the Pine and Oak has been culled out where it could be reached, much of it remains

practically untouched on account of the extremely rugged and inacessible character of the slopes. On the south side of the mountain the forest consists of a mixed growth of Pine (*Pinus echinata*) and deciduous species, the Pine in some places forming more than half of the stand. Some very fine tall specimens of the Pine are to be seen here. The growth on these sterile sandstone slopes has been extremely slow; an attempt to count the annual rings on a number of stumps, although not very definite on account of their badly weathered condition, indicated an age of from 70 to 115 years for trees fourteen to sixteen inches in diameter. White Oak, Post Oak, Red Oak, Black Gum, Sweet Gum and two or three species of Hickories are the most abundant hardwood trees, with Chinquapin (*Castanea ozarkensis*), Flowering Dogwood, Tree Huckleberry and two low Huckleberries (*Vaccinium vacillans* and *V. stamineum*) as undergrowth. Along ledges and ravines many other trees and shrubs occur, amongst which are the Low Willow (*Salix humilis*), Ward's Willow (*S. longipes* var. *Wardii*), Hop Hornbeam, Juneberry (*Amelanchier canadensis*), Witch Hazel (*Hamamelis macrophylla*), two southern Red Haws (*Crataegus apiifolia* and *C. spathulata*), Redbud, Black Locust, Wild Cherry, Big Tree Plum (*Prunus mexicana*), Red Maple, White Ash, Southern Black Haw (*Viburnum rufidulum*), Sassafras and the low spiny Rose, *Rosa subserrulata*. The French Mulberry (*Callicarpa americana*) is found at the lower levels, and the curious little shrub *Andrachne phyllanthoides* was collected on a shale bank near the base. In the protection of ledges that stand out at various levels and along the cliffs about the rim of the table-land, many interesting plants are growing. Here are found the Fringe-tree (*Chionanthus virginica*), Poison Ivy, Juneberry and Wild Cherry, as well as the Marginal Shield Fern and Woolly Lip Fern.

A considerable portion of the comparatively level top of the mountain has been cleared, but much of it has partially relapsed into forest. What appears to be an original growth of White Oak, Post Oak and Hickory remains in some places. Toward the wind-swept western end and along the southern rim all of the trees have a gnarled and stunted appearance, and it is probable that the timber here was never large. The cliffs on the south side are very irregular and broken and are seldom of great height; at some points they are buttressed with bold outstanding promontories or are flanked with detatched masses and chimney-like columns. Along the top is often a stunted growth of Red Cedar (*Juniperus virginiana*), Black-jack, Post Oak, Buckthorn or Gum Elastic (*Bumelia lanuginosa*) and Tree Huckleberry.

Farther back in more protected situations the trees are somewhat larger and the flora is much more varied. Here are found the Black Gum, Wild Cherry, Black Walnut, Mulberry, Mockernut, Wafer Ash (*Ptelea trifoliata*), Yellow-flowered Honeysuckle (*Lonicera flava*) and several species of *Crataegus* of the *Crus-galli*, *Pruinosae* and *Macracanthae*

groups. Rich woods conditions prevail on some of the gentle north slopes, and a variety of attractive wild flowers bloom here in season.

While the drainage of the plateau is largely subterranean, a few ravines and small intermittent streams have developed and flow toward the north or south sides. Springs issue from a few of these, even near the mountain top; along one near the south margin a small boggy area has developed, where were collected a Quillwort (*Isoetes Butleri*) and Sphagnum moss, besides several interesting flowering plants. A species of Meadow Beauty (*Rhexia interior*) and the Closed Gentian (*Gentiana clausa*) and *Iris cristata* were found along another brooklet flowing in the other direction. The situation seems very curious for such plants. In some of the old clearings *Pinus echinata* is beginning to establish itself, all of the trees being perhaps less than twenty years of age. This tree does not appear to have gained a footing on the plateau prior to the clearing away of the original forest, probably due to its inability to compete with the deciduous species.

It is, however, on the north side of the mountain that the most interesting conditions prevail. The cliffs here are much higher and more precipitous, in many places having a sheer perpendicular face of from one to two hundred feet. The views, looking down from some of the outstanding points into the dark wooded gorges a thousand feet or more below, are truly magnificent, and on clear days a wonderful panorama of the surrounding country is spread out. Nowhere else in this unusually picturesque part of America have I seen anything that approaches it, and for variety and beauty perhaps few finer views can be had even in the higher mountains.

Along the margins of these bluffs are found the Shellbark Hickory, Red and Chinquapin Oaks, Juneberry, Wafer Ash, Buckeye (*Aesculus glabra*), Linden (*Tilia floridana*), Ninebark (*Physocarpus intermedius*) and Sugar Maple. The leaves of some of the Amelanchier bushes observed here in October were of a brilliant red color, between scarlet and crimson, while on others close by, the foliage was still green or of a pale yellow tint. Whether there were any other differences amounting to varietal distinctions it was impossible to tell in the absence of flowers or fruit.

Just below the top of the cliffs and along its upper ledges the Broad-leaved Mock Orange (*Philadelphus pubescens*) is very abundant, and during the blooming season, in the latter part of May, it makes a wonderful display with its abundant waxy white blossoms in the romantic setting of these castellated rocks. In the same situations, and equally abundant, is the Prickly-fruited Gooseberry (*Ribes Cynosbati*), and here too was found the Mountain Woodsia (*Woodsia scopulina*), this being the only station known for it at present between the Appalachian Mountains of South Carolina and the western Rockies. As one descends the slopes below the cliffs, the trees increase in size and density of growth, as well

as in variety of species. There is no Pine on this side of the mountain, but there are many magnificent specimens of White and Red Oak, Black Gum, Black Walnut, Sugar Maple, White Ash, Linden and Hickories. One of the Hickories, usually having a tall symmetrical trunk, clothed with pale, reticulately ridged but close bark, may represent an undescribed species. The same species has also been observed on the north slopes of Rich Mountain, Oklahoma. It appears to be somewhat intermediate between *Carya alba* and *C. Buckleyi*.

Springs are much more abundant and of larger volume here than on the south side of the mountain, and some of them follow ravines, which, starting on a small scale near the top of the mountain, develop into deep rocky gorges and canyons, which are difficult to follow and almost equally difficult to escape from. About some of the springs and on dripping ledges, Sphagnum moss is abundant, with a variety of ferns, one or two Orchids and various other moisture-loving plants.

Deposits of rich soil and humus have accumulated in coves and along ledges far down on the mountain side. Here are found the Spice-bush (*Benzoin aestivale*), the Bladder-nut (*Staphylea trifolia*), Tear-blanket (*Aralia spinosa*), Cucumber tree (*Magnolia acuminata*) and Yellow Wood (*Cladrastis lutea*). The Oaks, Hickories, Ash, Sugar Maple, Walnut, Black Gum and Linden also attain a large size in such places, and in the dense shade and abundant moisture an herbaceous flora of decidedly northern aspect flourishes. *Botrychium virginianum* and the Fragile, Maidenhair and Christmas Ferns, the Broad-leaved Sedge (*Carex laxiflora* var. *latifolia*), Blue Cohosh, White-fruited *Actaea* and two species of *Trillium* are characteristic plants of these rich coves, to the deeper recesses of which full sunlight seldom penetrates. Extensive areas below some of the high cliffs are occupied by the rubble derived from them in the course of ages. These loose deposits sometimes have a steep slope and the forest trees and shrubs can make little headway upon them. Sometimes, however, isolated individuals or small colonies of Chinquapin, Yellow Wood or other small trees have gained a foothold, and the Winter Grape (*Vitis cordifolia*) trails widely over the rocks or the Prickly-fruited Gooseberry, Bladder-nut, Hydrangea or other shrubs flourish in the clefts. *Polymnia canadensis* is also very common and characteristic of such places, and in the protection of the moss and lichen-covered boulders grow the Northern Polypody (*Polypodium virginianum*), the Walking-leaf Fern, Mountain Woodsia and several other ferns and small flowering plants. The presence of some of these plants and the abundance of thick-shelled snails amongst the rubble and humus, indicates that lime is not entirely lacking in the composition of the rocks, a fact that is confirmed at other points in the region by the presence of calcified fossils in the Pennsylvanian sandstone.

In small rocky glades and sterile eroded areas on top of the mountain many prairie plants are found. Grasses, Composites and Legumes are

amongst the most abundant, and along exposed ledges grow such xerophytic species as *Polygonum aviculare, Paronychia dichotoma* and *Opuntia humifusa.*

In the open woods bordering the cliffs and along their margins there is growing a shrubby or semi-arborescent Oak of such distinct and striking character that it does not seem possible to refer it to any described species. It seems confined to this side of the plateau, but is not rare locally, some scores of specimens having been examined. Characteristically it grows as an arborescent shrub, sending out numerous spreading slender boles or stems from a common base much as does the Chinquapin. Rarely it appears to grow into a small tree with a single stem, which is usually crooked or deflexed. The specimens seen range in height from three to about eight or nine meters, and some of the smaller ones were fruiting. The leaves are nearly always broad-based and cordate, and are often broader than long, somewhat resembling those of the Sugar Maple. In autumn they turn a bright crimson as in the Scarlet Oak. It is clearly related to the Red Oaks and to the *Quercus Shumardii* group, to which I am referring it as a variety.[1]

Having thus hastily sketched the structure and flora of the largest and most interesting of the mountains of Arkansas, that in distant view excited the admiration and interest of Nuttall, more than a century ago, but which he was unable to explore at that time, let us now return to his further travels.

On April 20th he proceeded up the river, from the Dardanelle rocks, in a pirogue with two French boatmen. The beauty of the scenery, enhanced at this season by the budding verdure, the songs of birds and the humming of the wild bees in the Willows (*Salix caroliniana* or *S. nigra*, as it is now known) is enthusiastically described. He mentions passing the mouths of Carbonniere, Spadra, and Piney Creeks, and seeing in the distance a lofty blue ridge called by the French hunters the Cassetête or Tomahawk Mountain, which he thought, bore some resemblance to the Magazine, and beyond, another range called the Gascon Hills. The scenery along the Arkansas River in this part he compares with that of the Ohio, to which indeed it bears considerable resemblance. On the 24th he arrived at the garrison of Belle Point, which he made his depot of supplies and base for his further explorations. In the vicinity of the fort he found many attractive flowering plants, several of them new to science. The Bow-wood (*Maclura pomifera*) was growing on the hills bordering the Poteau (or as he spells it Pottoe) River; some of these were 50 or 60 feet high and with trunks as much as 12 inches in diameter. Amongst other herbaceous plants which he mentions finding on a trip to Cedar Prairie was one belonging to the family *Hydrophyllaceae* which he made the type of a new genus (*Nemophila phacelioides*).

About the middle of May Nuttall set out, with a military party from

[1] See p. 54.

the post, on a journey to Red River at the point where it is joined by the Kiamichi. The official object of the expedition was the unpopular one of removing all of the unauthorized white settlers from territory that had been assigned to the Osage Indians. Their route led them through the extremely rough, mountainous country of eastern Oklahoma, and farther on over the comparatively level prairie lands, underlaid by the Cretaceous limestone.

Nuttall gives some faithful descriptions of the country traversed, mentioning again the conspicuous mountains, called the Cavanal (spelled by him Cavaniol) and the Point de Sucre or Sugar Loaf, which he had previously seen from the river and the vicinity of the fort. He mentions in this part of the region, as elsewhere, the abundance of wild game, the party overtaking and killing two bears and encountering herds of bison and deer. Some of the rugged country along the Kiamichi, he suggests, strongly resembles the mountains of the Blue Ridge, at Harper's Ferry.

When the military party, having fulfilled their mission, began the return, Nuttall in his eagerness to collect more of the interesting plants of the prairies lingered behind, expecting to overtake them at a camp where they were to spend the night. However, having lost the trail, night overtook him and he was induced to remain until morning at the house of a settler, which he had fortuitously reached. Four guns which he fired in response to a similar signal from the commanding officer of the company were unheard by the soldiers, and as his horse strayed away during the night, he was unable to overtake them the following morning. His comment on the situation is interesting and rather characteristic: "My botanical acquisitions on the prairies proved, however, so interesting as almost to make me forget my situation, cast away as I was amidst the refuse of society, without money and without acquaintance; for calculating on nothing more certain than an immediate return, I was consequently unprovided with every means of subsistence." The seriousness of his predicament can only be appreciated by one somewhat familiar with the rugged and difficult character of the intervening country, much of which still remains almost in its primitive condition.

Here, perforce, he remained for several days at the house of a pioneer family whose generous hospitality, in spite of their meagre resources, he gratefully records. The time was spent by Nuttall in exploring and collecting the plants of the surrounding prairies. The beauty and variety of this early summer flora again excited his enthusiastic admiration, and he also tells us of the pleasure he experienced upon hearing here for the first time the song of the mocking-bird. Having heard of some hunters who proposed making a journey towards the fort, in search of horses that had been stolen from them by the Cherokees, he joined their party and set out into the wilderness. Becoming involved, however, in the intricacies of the mountains, they soon lost their bearing and wandered for several days before emerging into the valley of the Poteau River and

finding their location. Along the summit of the mountains near this stream, he writes, they passed through thickets of dwarf Oaks "(*Quercus chinquapin*, *Q. montana* and *Q. alba*)." These shrubs must have been the species now known as *Quercus prinoides* Willdenow, which is found abundantly in parts of eastern and central Oklahoma; and they may have been in part also hybrids between that species and *Quercus alba* (*Q. Faxoni* Trelease) or *Q. stellata*, the latter hybrid apparently having been found in Oklahoma and Kansas.

After remaining a few days at the garrison, Nuttall secured passage on a small boat bound for a trading establishment at the confluence of the Verdigris River with the Arkansas, 130 miles above the fort.

The beaches of the river which they passed abounded, he says, with natural orchards of the Chicasaw Plums. Near the mouth of Salisau Creek he saw for the first time near the Arkansas the Hazel (*Corylus americana*) and the American Raspberry (*Rubus occidentalis*). Both, however, are found, though not commonly, at a number of places in central Arkansas and eastern Oklahoma. Above the mouth of the Illinois River he observes the rapidly diminishing variety of the trees forming the forest. Along the river here they scarcely saw anything but the Smooth-barked cottonwood, Elm, Box-elder (*Acer Negundo*), "Curled Maple" (*Acer dasycarpon*, now called *A. saccharinum*) and Ash, all of them of reduced size. On the narrow strip of alluvial land, between the Grand River and the Verdigris near their confluence with the Arkansas, the forest again appeared more varied and the trees of larger size. Amongst them, he says, were lofty Scarlet Oaks, Ash and Hackberry, and the Nettle (*Urtica divaricata*) also covered many acres. From what I have seen of the Oaks in this vicinity, I assume that the species he called Scarlet Oak was in reality *Quercus Shumardii* var. *Schneckii*. Some thirty or forty miles up Grand River from this point he discovered on the rocky bluffs a large shrub, related to the Smoke-tree of southern Europe. To this he subsequently gave the name *Rhus cotinoides*, but later, recognizing that it was generically distinct from the true Sumachs, he rechristened it *Cotinus americanus*, by which name it is now known. This shrub or small tree, as it becomes in some places, is still one of the rarer and one of the most interesting of American woody plants. The fact that it has been found at several widely scattered stations from eastern Tennessee to western Texas clearly indicates that the generally local and small colonies are but relics of its once more general distribution. A few years ago I found it growing on high alluvial banks of the Ohio River just below Owensboro, Kentucky, a point that Nuttall passed in the earlier stages of his journey. However, it may have been a more recent introduction there, as it is usually found only in rocky ground and along bluffs.

About fifty miles up the river, near the mouth of Saline Creek, he says that Cane still continues to be abundant. On high alluvial ground near

the same place he also observed "the Coffee-bean Tree (*Gymnocladus canadensis*), the Over-cup White Oak (*Quercus macrocarpa*), the Pecan (*Carya olivaeformis*), the Common Hickory, Ash, Elm, and below, in places near the margin of the river, the Poplar-leaved Birch (*Betula populifolia*)." The Hickory referred to may have been *Carya ovata* or possibly *C. Buckleyi* var. *Arkansana*. The Poplar-leaved Birch, however, is not found anywhere near this part of the country, and the trees he mistook for it were doubtless the River Birch (*Betula nigra*). the only species of the genus that extends so far southwest. Nuttall returned to the mouth of the Verdigris from this short excursion by walking the distance of about thirty miles across the prairies. Not a tree, he says, appeared except along the brooks of Grand River and the Verdigris.

After returning to the settlement Nuttall again set out, accompanied by a trapper and hunter for the purpose of continuing his explorations up the Arkansas River and into the territory to the southward. They were now well beyond the wooded mountains and on the border of the great plains. Early on the journey he records finding "a second species of Brachyris, pungently aromatic to the taste, and glutinous to the touch; its aspect is that of Chrysocoma." This plant was later described by him under the name *Amphiachyris dracunculoides*.

Some time before starting on this excursion Nuttall had experienced a slight attack of the malarious fever, which was the scourge of many of the early settlements along the western rivers. This was doubtless due, as is now known, to the abundance of mosquitoes bred in the stagnant waters along their courses, the annoying frequency of which the author had mentioned many times. This malady now recurred with increasing severity and the alarming symptoms of delirium and nausea. This was aggravated too by the high temperature, the thermometer standing between 90 and 100°, by the absence of shade and especially by swarms of flies. After several days of this debilitating sickness he writes: "The heat of the weather continued excessive; and the green blow-flies, attracted by the meat brought to our camp, exceeded every thing than can be conceived. They filled even our clothes with maggots, and penetrated into the wounds of our horses, so as to render them almost incurable." Nuttall now grew so weak from the effects of the fever that he was scarcely able to travel; for three days he tasted no food and for some time subsisted principally on wild honey diluted with water.

The country they had been traversing was beset with thickets and ponds, but Nuttall says little about the flora at this time. He mentions some ponds of great extent, in which were growing thousands of acres of the great Pond-lily (*Cyamus luteus*, or as now called, *Nymphaea advena* or *Nuphar advena*). Growing here he also found *Thalia dealbata* and *Zizania miliacea*. They at length emerged on the prairies; but now they were beset by the fear of hostile Indians, traces and the lurking presence of whom they saw on several occasions. After hastily breaking up their

camp to escape the marauders, they proceeded to move to a safer position. But Nuttall had now become so enfeebled that he could not walk and had to be assisted by his companion to get on and off his horse. In this condition he also suffered greatly from exposure to storms and the unavoidable soaking of clothing when streams had to be crossed, as well as from cold when a sudden drop in the temperature occurred. Nights of delirium and days of difficult and dangerous travel ensued as they pushed on, often short of provisions and without potable water, across unknown country, until at length he and his companion came out upon a branch of the Canadian River. The upland divides which they crossed before reaching this stream he describes as "deeply undulating country, abounding with clear grit springs, but the land poor and covered with scrub Oak, except occasional prairie openings and narrow valleys." The small Chinquapin Oak, he says, was found by acres, running along the ground as in New Jersey. They proceeded to follow the stream, and here they felt the loss of the spring water, as that of the river was saline and nauseous. Before they had gone far down the stream Nuttall's companion had the misfortune to lose his horse, through its becoming mired in a ravine. In this dilemma his only resource was to construct a canoe in which to transport himself and baggage down the river. Nuttall attempted to follow with his horse along the banks of the Canadian and the Arkansas, which they at length reached. Traveling along the sand beaches, which he describes as being "hot and cheerless as the African deserts," and at places through almost impenetrable thickets and across the estuaries of tributary streams, he at length found himself unable to keep up with the hunter, and they agreed to part. Through all this part of the journey they had been harassed by the lurking Indians and by their importunities and threatening attitude when they encountered them. Feeling constantly in danger of robbery or perhaps of their lives as the marauders followed them stealthily, they were afraid to build fires or lie down to rest.

After leaving his companion, and provided only with a small supply of elk meat, Nuttall's distress and alarm was soon increased by the discovery that his gun and powder were rendered useless through the latter becoming wet, and that he had no means of obtaining fire or provisions. Leaving the river he struck out over the wooded hills, hoping to reach the Verdigris settlement. As night overtook him in an impenetrable thicket he tells us, "I had to lie down alone in the rank weeds, amidst mosquitoes, without fire, food or water, as the meat with which I had been provided was raw and spoiled by the worms." The next day he had the good fortune to arrive at the settlement, an asylum, which he says, probably at that time rescued him from death. Weak and exhausted from long exposure and sickness, he was seized with the most violent cramps, and they were compelled to cut the clothing from his swollen limbs. In this condition he remained for several days, racked

with pain and fever and dwelling in delirium on the scenes of his past sufferings, until he was at length able to return by boat to the garrison at Belle Point.

We need not follow further the adventures of Nuttall, as his speedier return journey was down the Arkansas river, reversing the route he had laboriously followed in the upward passage. Even in the few short months intervening between his visits to Arkansas Post and some of the other settlements he found them greatly changed and augmented in population and industries. Already the first press had been established at the territorial capital, the new governor had arrived and the additional number of lawyers, doctors and mechanics was noticeable, while ambitious plans were being launched for new towns and added enterprises in those already established.

He had now completed his exploration of the Arkansas Territory, so far as the time and means of transportation permitted, and for the first time as a result the scientific world learned something of its extremely interesting flora and fauna, besides much other valuable information. In his passage down the Mississippi River to New Orleans he makes a number of comments on the forests and flora as he observed them from the boat. But as there is little new or of interest mentioned, at least until he had passed beyond the boundaries of Arkansas, it is scarcely necessary to mention them, except for the note that he first observed the Long Moss (*Tillandsia usneoides*) in the Cypress bend, about 40 miles below the mouth of the Arkansas.

In estimating the value of Nuttall's work and the courage and devotion displayed in his journey through Arkansas, it is necessary also to have in mind the general status of science in America in the second decade of the Nineteenth Century.

The country had but recently emerged from its second struggle with Great Britain, and the pressing material demands of reconstruction and expansion and of developing industry in a new country were such as to leave little time or resource for the promotion of less practical objects. The first foundation stones of American literature and art were being laid, and a creditable beginning had already been made in several branches of science; but native literature descriptive of the flora and fauna was as yet very meagre. Hitherto the work of exploring and describing the natural history of the New World had been largely carried on by visiting scientists and explorers from Europe. The Michaux, father and son, had traveled extensively in the Eastern and Southern States, and as a result of their efforts elaborate descriptions of many of the American trees and lesser plants had been published in France; and it was largely through the incentive furnished by their work that Nuttall was led, as he relates in the preface to his Silva, to undertake the further exploration of American botany. Gronovius (and Linnaeus) had in 1739, published the Flora of Virginia, based upon the collections of John Clayton, an

English physician and botanist long resident in Virginia. Peter Kalm, a Swedish naturalist, had visited the Colonies from 1748 to 1751, and an account of his travels had appeared in 1753. Thomas Walter's Flora Caroliniana, written in Latin, was published in London in 1788, the author being also an Englishman who had settled as a planter and physician in the Colonies. Numerous other scientific visitors, such as Du Pratz, Dwight, Darby, Brickell, Bradbury and Pursh, had through their writings, added something to the interest in and knowledge of American forests and botany.

Such domestic interest as existed in the various branches of natural science was confined mainly to a few of the larger centers of population along the Atlantic coast. Philadelphia, as the metropolis of the country and the chief seat of its wealth and culture, naturally took the leading position in these matters. The early establishment of the Academy of Natural Sciences in that city and the development of Bartram's Garden, the first attempt at a botanical garden in America, were factors in securing that leadership. The most important contribution towards a general knowledge and appreciation of the American flora from a native source was undoubtedly found in the work of John Bartram and of his son William, both of whom travelled and wrote upon the native flora and other branches of natural history, in addition to the practical work carried on in plant introduction and culture at the Garden established by the elder Bartram.

The first technical book on American trees by a native author had appeared in 1785, being the "Arbustrum Americanum" of Humphrey Marshall, a work in which the accepted binomials of many of our American woody plants were originally published.

Museums had at this time already been established in several of the larger towns, but they were in the main merely collections of curiosities. Thomas Jefferson, through his interest in the antiquities and natural history of his native state and his writings on these subjects, some of which were communicated to the American Philosophical Society, had brought upon himself some ridicule from his political opponents. A penchant for digging up antediluvian bones and pottering over useless or pernicious plants and birds was considered fair game by the wits of the period, an attitude of mind that does not seem to have been entirely outgrown even in our own enlightened times.

In the newer parts of the country, that vast and largely unknown empire recently acquired from France, that lay beyond the Mississippi, men were as yet quite too busy with the practical problems involved in subduing the wilderness and wringing from Nature the means of satisfying their more primitive needs, to have either the time or the inclination for admiring her beauties or delving through long and patient study into her guarded secrets. The rugged and practical types of men who were first attracted to the frontiers, and who as trappers, traders and

pioneer settlers were all unconsciously playing the heroic roles of advance guards in the march of civilization, could scarcely be expected to place much value on such matters or to understand or have fellowship with the abstractive philosopher or ungainful scientist. When we consider all these circumstances and the amusing but often embarassing curiosity and incredulity that the student of natural history encounters even today in that part of the country, we cannot help wondering what must have been the attitude of the stolid pioneers towards a traveler whose avowed purpose was neither the acquisition of lands, the purveying of merchandise nor the service of government, but merely the curious study and collection of rocks, birds and plants and the exploration of Indian antiquities.

Thomas Nuttall was born in Yorkshire, England in 1786 and emigrated to the United States in 1808, remaining in this country until 1842, when he returned to England to take possession of an estate near Liverpool, that he had inherited, and where he died in 1859. Most of the active and fruitful years of his life were therefore spent here; and his fame as a naturalist rests almost entirely upon his work on the North American flora and fauna. His contributions to these sciences may therefore be considered distinctively American.

Besides the journey reviewed in the present paper, Nuttall traveled extensively in other parts of America during his residence of thirty-four years here. Most of his earlier explorations in the interest of science were in the Eastern States, extending ultimately from Canada to the Carolinas and Florida. In 1810–'12 he, together with John Bradbury, a naturalist of Scotland, acompanied Hunt and Stuart on their expedition to the mouth of the Columbia River for the purpose of establishing the fur trading post of Astoria at that point. In 1834–'35 he made a second trip up the Missouri River and to the Columbia River region, this time with the party led by Captain Wyeth and accompanied by John K. Townsend, who has left an account of the journey. Before returning from this trip Nuttall also visited the Hawaiian Islands and California.

From 1822 to 1834 Nuttall held the position of Curator of the Botanical Garden at Cambridge and lecturer on Natural History at Harvard College. Some of his literary work was done here during this period; but most of it, including the "Journal of Travels to the Arkansa Territory," was prepared and published at Philadelphia. The most important of his botanical works are, "The Genera of North American Plants," 2 volumes, 1818, and "The North American Silva," 3 volumes, 1842–'45; besides many memoirs and papers published mostly in the Journal of the Academy of Natural Sciences of Philadelphia, and the Transactions of the American Philosophical Society, of the same city. The journey to Arkansas, in addition to the Journal, resulted in the description of several new genera and many new species of plants, besides an uncompleted work, "Collections towards a Flora of Arkansas,"

communicated to the Philosophical Society. He is also the author of "A Manual of the Ornithology of the United States and Canada," in two volumes, 1834–'40, a work that is still regarded as authoritative in its field, and of some papers on mineralogy.

As an appendix to the "Journal of Travels into the Arkansa Territory" he published "An Account of the Ancient Aboriginal Population of the Banks of the Mississippi and the Contiguous Country." in which he quotes freely and at length from the account given by Purchas[1] of the travels and observations of Ferdinand de Soto in the Mississippi Valley and into the present limits of Arkansas. There are also appended papers on "The History of the Natchez" and "Observations on the Chicasaws and Choctaws," as well as a table of "Thermometrical Observations in the Arkansa Territory," which is the earliest temperature record available for that part of the country.

Not only were the scientific attainments, of Thomas Nuttall varied, but his views and interests in regard to other matters appear from his writings to have been equally broad and catholic. He was at the same time almost a recluse in his tastes and habits, and like many philosophers, it was his inclination to withdraw as far as possible from contact with the practical and aggressive world and find solace in reflection and study and in solitary rambles for communion with nature. There was a strong vein of poetry in his nature that is often apparent in the colorful passages of his writings and in many of the names which he fancifully applied to the genera and species of plants which he described. Besides those names drawn directly from Greek mythology such examples as *Chrysopsis* (aspect of gold), *Phoradendron* (robber of a tree), *Nemophila* (loving the grove) and *Erigenia* (born in the spring), are a few examples. As a naturalist his insight was keen and his work of a high order, as was attested by his contemporaries and confirmed by the more critical standards of later times.

The generic name *Nuttallia* has been proposed by various authors for plants of several different families, to commemorate his name and as a tribute to his labor and skill in the field of botany. The genus to which it is now applied belongs to the family *Loasaceae;* and there are a number of species of the genus found in the southwestern United States and Mexico. A large number of species in many groups have also been named in his honor, and the name "Nuttallii" is familiar to all students of plants in the regions where he collected.

The present paper can add little to the well-established fame of the gifted naturalist and pioneer American botanist and explorer, Thomas Nuttall, but it is hoped that by calling attention to the indefatigable zeal and courage displayed by him in initiating and carrying out the solitary journey to Arkansas, which considering all the circumstances was perhaps the most hazardous and arduous of his travels, it may serve

[1] Purchas, Samuel.—Purchas, his Pilgrims, London, 1625.

to arouse a renewed interest in his work, especially that part of it dealing with the flora, not thoroughly known or explored even today, of the southern part of the mid-continent region, that he so interestingly described in the "Journal of Travels into Arkansa Territory."

Quercus Nuttallii, sp. nov.

Arbor pyramidata circiter 22m. alta (vel interdum altior), tenuiter ramosa; ramis ascendentibus cinereis vel cinereo-brunneis inferis horizontalibus vel leviter dependentibus; ramulis annotinis olivaceo-viridibus vel rubro-brunneis; trunci cortice laevigato vel paulo fisso usque ad 3 cm. crasso atro-cinereo raro cinereo-brunneo; gemmae conicae vel ovoideae, 4–6 mm. longae, rufo-brunneae apice ciliato-pubescentes. Folia ovata vel elliptica, 8–16 cm. longa et 5–12 cm. lata, apice acuta vel acuminata, basi cuneata vel in petiolum gracile 3–5 cm. longum attenuata, profunde sinuata-lobata, sinubus obtusis raro apice paulo contractis, lobis 5–7 setaceo-mucronatis, pari imo anguste deltoideo integro recto vel apice paulo recurvato, secundo tertioque paribus latioribus lobato-dentatis; junioria glabra, superne laete viridia, subtus paulo pallidiora glabra venularum axillis barbatis exceptis, matura papyracea sed firma barbulis axillorum persistentibus. Fructus sessilis vel brevipedunculatus, glande brevi-cylindrica vel ovato-oblonga 20-28 mm. longa 12–20 mm. lata brunnescente vel olivaceo-brunnescente ⅓–½ in cupula profunda inclusa; cupula hemisphaerica vel turbinata basi stipitato-attenuata intus velutina extus imbricato-squamosa, squamis oblongo-ovatis apice obtusis laxis puberibus.

A tree up to 22 meters (72 feet) tall, or perhaps sometimes taller, usually with a narrow pyramidal crown and slender ascending branches, or the lower horizontal or slightly drooping. Bark of the young branches olive-green tinged with red or reddish-brown, that of the larger branches smooth, gray, cinereous or slate-color, becoming dark brownish-gray and slightly fissured on old trunks, seldom 3 cm. (1 inch) thick. Leaves typically obovate or elliptic in outline, 8–16 cm. long, 5–12 cm. broad (rarely smaller), with acuminate apex and cuneate base attenuate into the slender 2–5 cm. long petioles, deeply divided by wide usually obtuse or sometimes slightly contracted sinuses into five or seven lobes, the lowest pair usually narrowly deltoid and entire with straight or slightly recurved points, the upper successively larger and more or less toothed, the terminal one often long-acuminate and provided with several teeth or secondary lobes, the points all terminating in conspicuous 4–10 mm. long bristles; the young leaves thin and of pale yellowish-green color on both sides or slightly paler beneath, glabrous above and provided beneath with conspicuous tufts of tomentum in the axils of the veins, but otherwise glabrous; at maturity firm but thin and with the axillary tufts of tomentum persisting. Fruit sessile or very short-stalked; nut short-cylindric or oblong-ovoid, usually full and rounded at

the base and apex, glabrous at maturity or often slightly pubescent especially towards the apex, olive-brown or light chestnut in color, 20–28 mm. long, 12–20 mm. in diameter (rarely smaller); ⅓ to ½ enclosed in the deep turbinate, hemispheric or cup-shaped cup, which is abruptly attenuate into a conspicuous scale-covered base 3–7 mm. long; the imbricated cup-scales oblong ovate, gradually narrowed above the broad base to the obtuse apex, thin, rather loose, puberulous or pubescent. Winter-buds ovoid or conic, gradually narrowed into the obtuse apex, 4–6 mm. long, bronze-green or reddish-brown, the ovate scales slightly pubescent or ciliate, especially towards their tips.

This long-neglected tree seems to represent one of the best-defined species of the obscure and difficult Red Oak group. It is apparently widely distributed, though seldom common, in the rich alluvial lowlands of the Coastal Plain, where it is often found growing in flood-plains subject to inundation, or even on the borders of swamps. I have never found it forming a large percent of the forest even in such places, but Mr. T. G. Harbison notes on one of his labels that it is a common tree in the delta about Morehead, Mississippi. In general habit the trees bear perhaps a closer resemblence to the Pin Oak (*Quercus palustris* Muenchhausen) than to any other species. The leaves also, although averaging larger, somewhat approximate through their range of variations those of the Pin Oak, and in some forms, where fruit and winter buds are absent, it is difficult to distinguish them from those of that species. The fruit, however, is very different and does not even indicate a close relationship with the Pin Oak, but is much nearer to that of *Quercus coccinea*, from which it is distinguished by the more pronounced constantly stipitate base of the cup, the different winter buds and the generally different type of leaves, with open sinus and simple, straight or recurved lower lobes, and especially by their conspicuous axillary tufts of tomentum. The habitat is also entirely different from that of the Scarlet Oak. But with the broader conception of species prevailing in Nuttall's time it is not at all surprising that it should have been mistaken for *Quercus coccinea*. From *Quercus Shumardii* var. *Schneckii*, to which specimens from this species have often been referred, it is even better distinguished by the much deeper cups with looser more pubescent scales, and by the thinner, less veiny leaves, generally of quite a distinct type. It is also well distinguished from the other Red Oaks by its much smoother bark, which resembles more that of the Water Oak (*Quercus nigra*), and which only becomes moderately rough, with broad shallow ridges, on the oldest trunks. On some specimens of the proposed species the leaves are lyrately pinnate and resemble in shape some forms of *Quercus lyrata*.

DISTRIBUTION. In rich alluvial lowlands of the Coastal Plain, from western Mississippi to eastern Texas and northward in the Mississippi Valley to southeastern Missouri (?) and Arkansas exclusive of the Ozark region.

SPECIMENS EXAMINED. Arkansas:—Arkansas Post, *J. H. Kellogg*, Sept. 28, 1909 (distributed without specific name; the lobes in this specimen are narrower than in the typical form); Arkansas City, *G. W. Letterman*, 1881 (distributed as *Q. rubra*); Duvall Bluff, Prairie County, *E. J. Palmer*, nos. 24345, 24346 & 24353, Oct. 24, 1923; McNab, Hempstead County, *E. J. Palmer*, nos. 29458 & 29462, Oct. 29, 1925. Mississippi:—Morehead, *T. G. Harbison*, nos. 3 & 8, May 31, 1915 ("low rich bottoms, common"; the former number without specific name, the latter as *Q. ellipsoidalis?*, both without fruit.); Vicksburg, *T. G. Harbison*, no. 9 (type) 10 & 11, Oct. 27, 1916; ("River bottoms"; all as *Q. ellipsoidelis?*). Louisiana:—Richland Parish. *R. S. Cocks*, no. 1915, Sept. 21, 1910 (as *Q. texana*); Munroe, *C. S. Sargent*, Oct. 8, 1913 (as *Q. texana;* later changed to *Q. Shumardii* var. *Schneckii*); Windsor, Ouachita Parish, *E. J. Palmer*, no. 8935, Oct. 13, 1915; Chopin, Natchitoches Parish, *E. J. Palmer*; no. 8835, Oct. 5, 1915. Texas:—Liberty, Liberty County, *E. J. Palmer*, no. 12774, Sept. 17, 1917.

Other specimens that may belong to this species are: Missouri:—Paw Paw Junction, *B. F. Bush*, no. 224, Sept. 3, 1897 (as *Q. palustris*); Butler County, *B. F. Bush*, no. 3770, Oct. 19, 1905 (as *Q. palustris*). Arkansas:—Moark, *B. F. Bush* no. 2645, May 4, 1905; (as *Q. palustris;* without fruit); Corning, Clay County, *E. J. Palmer*, no. 6069, June 24, 1914; (as *Q. palustris;* with immature fruit).

In the two Missouri specimens the fruit-cups are much shallower than in the type or other collections, but in other respects they resemble our proposed species. The fruit being much too large for *Q. palustris*, they had been transferred in the herbarium to *Q. Shumardii* var. *Schneckii* as had nearly all of the other specimens listed above, all of which are in the herbarium of the Arnold Arboretum.

Quercus Shumardii var. **acerifolia**, var. nov.

Frutex 3–6 m. altus vel raro arbor usque 9 m. alta. A typo recedit foliis brevi-ovatis, brevi-obovatis vel reniformibus latioribus saepe quam longis trilobatis vel quinquelobatis basi truncatis vel cordatis, iuvenilibus subtus floccoso-pubescentibus, mox glabrescentibus venis exceptis; fructu minore $^1/_5$–$^1/_3$ in cupula brevi-cyathiforme inclusa.

A shrub or small tree 3 to 9 m. (10–25 ft.) tall, usually with several spreading or ascending boles arising from a common base, and with erect or ascending branches forming a round top, or rarely becoming a small tree with branching or crooked trunk up to 3 decimeters in diameter. Bark on the branches of the year reddish-brown or olive tinged with red; on older branches gray, gray-brown or slate-color, often mottled with paler blotches; on old trunks sometimes becoming rough and furrowed and of a dark gray or almost black color. Winter-buds ovoid-conical, abruptly pointed or rounded at the apex, 4–6 mm. long with nearly glabrous ovate, round-tipped scales. Leaves short-ovate, short-obovate

to reniform in outline, often broader than long, 6–10 cm. long, 5–13 cm. broad, truncate to deeply cordate at the base, or rarely slightly cuneate on vigorous shoots; sinuately divided into three or five short-oblong lobes, all more or less toothed, the teeth terminating in bristles, the sinuses shallow and open or partially closed; thin when young and deeply tinged with red as they unfold, becoming yellowish-green on both sides, glabrous above and covered beneath with thin floccose pubescence, which is easily detached; at maturity firm, reticulately veined and having prominent mid-rib and primary veins and slender (3–4 cm. long) petioles, and then glabrous on both sides or with traces of pubescence remaining along the mid-rib and veins; turning to a brilliant crimson color in autumn. Fruit sessile, obovoid or short-cylindric; nut full and rounded at the base, rounded or slightly narrowed towards the apex, enclosed for $^1/_5$ to $^1/_3$ its length in the shallow saucer-shaped cup, olive-brown somewhat pubescent, 6–12 mm. long, 8–10 mm. in diameter; scales of cup thin, closely appressed, finely puberulent.

This very distinct-looking Oak, in appearance quite unlike any other that I know of, may well prove worthy, when better known, to be regarded as a distinct species. The fact, however, that it has so far been found only in one locality, makes me hesitate to pronounce it such until more is known as to the constancy of its characters and its possible variations under different conditions. The obscurity of characters and the intergradations between other described species and varieties of the group to which it belongs, is an additional reason for conservative treatment at this time.

The shrubs or trees described here were found in open woods and on partially eroded sandstone slopes, often along the edges of cliffs, on top of Magazine Mountain, Logan County, Arkansas, at an altitude of about 850 meters (2800 ft.). Here it was seen only near the north side of the small plateau forming the mountain top, but in the locality it is not rare, scores of specimens having been examined. The general character of the bark, winter-buds, and even of the foliage and fruit, although both of the latter, as pointed out, differ in important details from any of the other described species, clearly indicate its close relationship to *Quercus texana*, *Quercus Shumardii* and its variety *Schneckii*. The generally shrubby habit of this Oak, the small fruit with shallow cups, and especially its peculiar leaves, serve to readily distinguish it from any of its allies. The leaves have, so far as their shape is concerned, a close resemblance to those of the Sugar Maple, which has suggested the varietal name.

Specimens examined are my numbers 24130, Oct. 24, 1923; 24854, May 12, 1924; 26433, 26434 (type), 26437, and 26438, Oct. 8, 1924; 26940, April 26, 1925; and 26920, Nov. 9, 1925. All are in the herbarium of the Arnold Arboretum.

THE VARIETAL[1] CATEGORIES IN BOTANICAL NOMENCLATURE AND THEIR HISTORICAL DEVELOPMENT

ALFRED REHDER

WHEN Linnaeus in his Philosophia botanica formulated his definitions of genera, species and varieties, he also laid down rules for the formation of generic and specific names[2] but he did not propose for varieties names corresponding to his nomina trivialia. He contended that varieties do not need to concern the botanist and that they can be excluded from botany,[3] but that the more obvious varieties on account of their economic importance may be, if necessary, mentioned by the botanist at the end of the specific diagnosis[4] while to very slight varieties the botanist pays no attention.[5] In the examples he gives of varietal names the latter consists in the majority of cases of a phrase, like flore coeruleo, corolla plena, foliis simuosis et variegatis, fructu ex rubro et nigro variegato, etc.

In his Species plantarum, however, Linnaeus gives to most of the varieties he mentions a name corresponding to his nomen triviale which is placed like the specific name on the margin opposite the diagnosis and is printed in italics while the specific name is printed in roman; the diagnosis of the variety or the synonym which takes its place is preceded by a Greek letter, the first variety starting with β. The named varieties are chiefly those of horticulturally or economically important plants as in the genera Pyrus and Prunus, but there are also spontaneous plants enumerated as varieties, as *Quercus nigra* β and *Cupressus sempervirens* β; in these cases as in many others, e. g. *Juglans regia* and *Corylus Avellana*, without a name on the margin. Outside of Species plantarum Linnaeus hardly ever mentioned varieties, but apparently replaces when the name is not used in a strictly taxonomic arrangement the Greek letter by the term varietas, as in his Flora rybensis where he enumerates *Osmunda Lunaria* varietas *Beckeana*.[6]

Most authors followed the custom of preceding the name of the variety by a Greek or sometimes by a Roman letter or more rarely by a numeral. Curtis in 1792 was probably the first to use the term "var."[7], as did Stokes[8] and Watson.[9] Sims in 1802 used "var." in combination with a Greek

[1] The term "varietal" is used here and throughout the article in a general sense, including all subdivisions below the species.

[2] The term is used here in its modern sense. It may be pointed out that Linnaeus used the term nomen specificum not in the sense of our specific name, but that he understood under nomen specificum the phrase (differentia) by which the species is distinguished from all other species of the same genus, while the specific name, as we understand the term now, is his nomen triviale.

[3] Phil. Bot. § 158: excludi possent varietates e rei herbaria.

[4] Phil. Bot. § 306: nomini generico et specifico etiam varians si quod addi potest . . . evidentiores varietates ob usum publicum ad finem differentiae insert botanicus, ubi necesse est.

[5] Phil. Bot. § 310: varietates levissimas non caret botanicus.

[6] Amoen. Acad. VIII. 105 (1785).

[8] e. g. *Azalea nudiflora* var. *coccinea* in Bot. Mag. XVI. t. 180.

[7] e. g. *Ulmus surculosa* var. *latifolia* in his Mat. Med. II. 37 (1812).

[9] e. g. *Quercus Cerris* v. *dentata* in his Dendr. Brit. II. t. 93 (1825).

letter, but placed both in parenthesis[1] which seems to indicate that he did not consider the term var. or its symbol an essential part of the combination and that it might be omitted, as had been done as early as 1770 by Weston who was the first botanical writer to pay much attention to horticultural varieties and to give names to almost all he enumerated; he numbered the varieties and printed their names in italics like Linnaeus did but the numbers did not form part of the combination.[2] The term var. or its equivalent was also omitted by Schmidt[3] occasionally, by Dumont de Courset,[4] Michaux[5] and Seringe.[6]

Neither Linnæus nor any of the older authors give a distinct varietal name to the type of the species; they only named the deviations from the type and started therefore their enumeration with β or its equivalent. This does very well for species with few varieties, but in polymorphous species with many and often subordinate subdivisions, the arrangement of the various forms can be brought out clearer if the species is wholly subdivided into groups and the typical form either designated as typica, genuina, normalis or given a distinct name. One of the first to do this was P. De Candolle in 1818[7]; also Bunge in 1833[8] did the same.

Each of these methods had its followers and up to now systematic botanists seem to be nearly equally divided on this question. A. De Candolle says: le classement . . . des variétés [se fait] par la série des lettres grecques α, β, γ, etc.[9] which indicates that he favors the second method, as is also the case in the International Rules if one judges by recom. XXVIII. in which the use of a name for the typical subdivision of species is advocated. This second method is, however, opposed by a number of botanists and I may refer here to an article by Britten[10] criticising Dr. Moss' acceptance of this plan in his Cambridge British Flora. Britten says that "the plan which Dr. Moss rejects seems in accordance with that contemplated by the Rules" implying that the other plan does not conform to the Rules, but according to recom. XXVIII. as shown above, this does not seem to be the case. It appears to me that either one of the two plans may be followed without violating the Rules. Britten further says that if a species is wholly divided into varieties the binomial becomes an abstraction and is nothing but a synonym of the trinomial name of the

[1] e. g. *Ixia capillaris* (var. γ) *gracillima* in Bot. Mag. XVI. t. 570, but in the index as *Ixia capillaris* var. *gracillima*.

[2] e. g. *Berberis vulgaris alba* in his Bot. Univ. I. 20, *Aloe margaritifera minor* and *A. margaritifera minima*, l. c. 6.

[3] e. g. *Philadelphus coronarius nanus* in his Oesterr. Baumz. I. t. 60 (1792); also *Lonicera Periclymenum serotinum*, l. c. II. t. 108 (1794).

[4] e. g. *Quercus rubra latifolia* in his Bot. Cult. III. 732 (1802).

[5] e. g. *Quercus Prinus discolor* in his Hist. Arb. For. II. 46 (1810).

[6] e. g. *Salix reticulata subrotunda* in his Essai Monog. Saules Suisse, 29 (1815).

[7] e. g. *Clematis flammula* α. *rotundifolia* in his Syst. I. 134; see also *Hesperis matronalis* α. *hortensis* in his Syst. II. 450 (1821), and *Brassica oleracea* A. *sylvestris* (l. c. 583).

[8] e. g. *Amygdalus pedunculata* α. *simplex* in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).

[9] in his Lois Nomencl. Bot. 16 (1867).

[10] in Jour. Bot. LIII. 334–337 (1916).

typical form or variety, and he contends that the binomial does not include the varieties, but stands only for the typical form which therefore would not need a varietal designation. As far as I know the general usage, the binomial may include the subdivisions grouped under it or it may stand only for the type, the exact meaning can usually, but not always, be ascertained from the character of the publication or the connection in which the name is used. The existence of a trinomial for the type makes it possible in a species with one or several varieties to state distinctly that one refers only to the typical form exclusive of any variations belonging to the species.

None of the earlier authors distinguished more than one category of varietal names except Persoon who speaks of subspecies and varieties.[1] His subspecies are apparently the subdivisions preceded by a Greek letter, while the term variety is applied to a lower category representing horticultural forms as shown e. g. by the enumeration of forms of *Pyrus communis* as:—*Pyraster*,—*faleria*,—*pompejana*,—*faronia*, etc., preceded by the phrase "Varietates praecipuae sequentes sunt" (Syn. Pl. II. 40); forms of *Pyrus Malus*, *Prunus Cerasus* and *P. domestica* are similarly treated. The first use of subordinate varietal categories I have been able to find is by P. De Candolle in 1818 in his Systema plantarum[2] and still better examples will be found in the second volume of that work published three years later.[3] In his memoir of *Brassica oleracea* which he presented in 1821 in a less strictly botanical form to the Horticultural Society of London he distinguishes three categories: stirps (race), varietas and subvarietas. Gaudin in 1830 implied subordination in combinations like *Salix alba βγ sericea* which apparently stands for *Salix alba β vitellina γ sericea*.[4] Ortmann in 1835 did not indicate special terms for his subordinate categories, but used roman letters for the first and Greek letters for the second subdivision as in *Tilia grandifolia* c. *obliqua α. minor* and *β. major*.[5] In 1864 A. De Candolle designated the higher category as subspecies and the lower by a Greek letter which no doubt stands for variety as in *Quercus robur* subsp. *pedunculata α. vulgaris*[6] and three years later in his Lois de la nomenclature botanique (p. 15) he proposes subspecies (proles), varietas, subvarietas, variatio and subvariatio and for cultivated modifications according to their origin satus, mistus and lusus. In 1876 Debeaux described a *Vitis humulifolia* Forma *glabra*[7] which may be the first definite use of the term forma, though in 1868 Anderson spoke of formae which are apparently more or less equivalent to his subspecies and modificationes primariae[8] and Planchon in 1873 had grouped under "Formae pubescentes"

[1] "Varietates praecipuae et subspecies non omissae sunt" in his Syn. Pl. I. (pref.) x. (1802).
[2] e. g. *Ranunculus bullatus β grandiflorus* pleno flore* in hist Syst. I. 254.
[3] e. g. *Hesperis matronalis α. hortensis * albiflora + plena* in his Syst. Pl. II. 450 (1821), and *Brassica oleracea* B. *acephala β. vulgaris * viridis* (l. c. 583).
[4] in his Fl. Helv. IV. 206.
[5] in Flora, VIII. pt. II. 502.
[6] in Prodr. XVI. pt. II. 4.
[7] in Act. Linn. Soc. Bordeaux, XXXI. 132 (Fl. Tché-Foû, 37).
[8] in De Candolle, Prodr. XVI. pt. II. 252 and 253.

several varieties of *Ulmus campestris*.[1] These botanists apparently employed the term forma in the same sense as Rouy proposed in 1893,[2] namely for a group intercalated between subspecies and variety. Later, however, Planchon[3] and other botanists, like Kuntze[4] and Engler[5] used forma for a group below varietas and in the Rules of botanical nomenclature adopted by the Vienna Congress the term forma was made to take the place of variatio, a term too similar to varietas and apt to be confused with it particularly when abbreviated. The sequence of the subordinate categories below specific rank is given in art. XII. of these Rules as follows: subspecies, varietas, subvarietas, forma, individuum, with the remark, that if the number of groups is insufficient, it may be augmented by intercalation of supplementary groups. Such groups are proles (race), placed between subspecies and varietas, subforma, and below subforma lusus and monstrositas. In polymorphous species combinations have been published consisting of 5 or 6 or even 7 names as: *Betula alba* subsp. *verrucosa* α. *vulgaris* 3. *microphylla* Regel,[6] *Pseudomorus Brunoniana* α. *pendulina* subvar. *castaneaefolia* variatio *scabra* Bureau,[7] *Lythrum salicaria* α. *intermedium* a. *gracilius* a. *angustius* aa. *anceps* Koehne,[8] *Acer pseudoplatanus* subsp. *typicum* var. *coloratum* subvar. *lutescens* [f.] 23. *flavescens* Schwerin[9] *Saxifraga aizoon* subsp. *euaizoon* var. *typica* subvar. *brevifolia* f. *multicaulis* subf. *surculosa* Engler & Irmscher.[10] Such polynomials may be useful for classificatory purposes and have their proper place in a monographic treatment of polymorphous species, but as names they are too cumbersome and defeat the purpose of botanical nomenclature whose aim should be to make it possible to designate a given plant in the briefest and most practical and at the same time unequivocal way. It is not practical to give to every form which it may be possible to distinguish a binomial name as was done by Gandoger and to a lesser degree by a few other botanists, but likewise for practical reasons one should certainly not go beyond a trinomial name. That three names should be sufficient for the designation of any given plant is implied in the wording of article 29. of the International Rules and that this is the intended meaning of the article in question was confirmed by Dr. Briquet who states in a letter to me dated April 22, 1912 that one could in quoting e.g. a form omit the names of the inter-

[1] in De Candolle, Prodr. XVII. 156.

[2] in his Fl. de France, I. p. XI.—In volume X, however, published in 1908 Rouy changed in deference, though under protest, to the decision of the Vienna Congress this term to race (proles) and dropped the term forma entirely (see p. 3, in note).

[3] e. g. *Cissus sicyoides* forma b. *oxyodon* in De Candolle, Monog. v. 523 (1887)—That this is intended for a category below the variety becomes clear from his remark on p. 522 "Les formes . . . peut-être quelques-unes pourront-elles prendre au moins le rang des variétés ou mêmes d'espèces."

[4] e. g. *Rubus arcticus* f. *grandiflora* in his Meth. Spez. Rubus 147 (1879).

[5] e. g. *Rhus copallina* α. *latifolia* α. 1. *angustialata* in De Candolle, Monog. IV. 384 (1883). "Haec forma."

[6] in De Candolle, Prodr. XVI. pt. II. 163 (1868).

[7] in De Candolle, Prodr. XVII. 250 (1873).

[8] in Bot. Jahrb. I. 327 (1881).

[9] in Gartenfl. XLII. 263 (Var. Gatt. Acer 25) (1893).

[10] in Engler, Pflanzenr. IV.-117, p. 497 (1916).

calated subspecies and variety. As it is not necessary to mention the subgenus and section in a large genus when citing a binomial, so the names inserted between the specific name and the lowest subdivision one wants to quote may be omitted. These names belong to the category which Linnaeus called "nomina muta" as contrasted with the nomina sonora,[1] namely the generic, the specific and if necessary the varietal name. If these intercalated names are omitted, the question, however, arises whether the indication of grade or rank as given in the original combination should be preserved, whether e. g. *Prunus japonica* var. *gracillima* f. *Engleri* Koehne[2] should be quoted as *P. japonica* f. *Engleri* Koehne which might be considered as suggesting that f. *Engleri* is a form of typical *P. japonica*, which it is not.

In shortening a polynomial in which the subordinate subdivisions are indicated by symbols as *Rosa uriensis* B. *pubescens* IIa. *typica* 2. *gracilis* c. *heteracantha* R. Keller[3] it may be cited, as done in Ascherson & Graebner's work, as *R. uriensis* BIIa2c *heteracantha* according to the method explained in the preface, the symbols indicating the position of the third name. This is practically the same method as used in 1830 by Gaudin.[4] This method of citation is, of course, useful only in reference to the systematic arrangement of the original publication; aside from it, it has no significance and cannot be employed if the combination is used as a valid name in another publication in which it must necessarily conform to the method of classification used therein. It would seem the simplest method in all cases in which such a combination is used or cited without reference to its place of publication, to use the name as a straight trinomial, that is a trinomial without the intercalation of an abbreviation or symbol indicating a certain grade or rank between its second and third component. A trinomial in which the position of the third component is modified by a symbol or abbreviation might be called a modified trinomial. Though many botanists employ the term trinomial exclusively for the kind here called straight trinomial, I prefer to use the term for all combinations of three names, as it was used e. g. by the botanists of Harvard University in the amendments proposed for the Vienna Congress[5] and as J. Britten[6] is inclined to use it, who says that "a name consisting of three words for one of two, and this, even if the third word is separated from the two preceding it by the abbreviation "var." seems to me to all intents and purposes a trinomial." Straight trinomials have been used by many botanists and botanical writers since more than 150 years, first probably by Weston.[7] Of other authors

[1] Phil. Bot. $\frac{5}{3}$ 212.
[2] in Sargent, Pl. Wilson. 1. 266 (1912).
[3] Ascherson & Graebner, Syn. Mitteleur. Fl. VI. pt. 1. 240 (1902).
[4] See p. 58, footnote 4.
[5] Propos. Chang. Lois Nomencl. Bot. p. 18 (1904).
[6] Jour. Bot. LIII. 334 (1915).
[7] See p. 57, footnotes 2–6.

besides those cited on p. 57, may be mentioned Alefeld,[1] Anderson,[2] Planchon,[3] Vesque,[4] Ascherson & Graebner,[5] Rock,[6] Trelease,[7] Reynier;[8] also T. Fournier speaks in favor of the straight trinomial.[9] Straight trinomials are the rule in the Philadelphia or American Code which recognizes only one subdivision below the species, called subspecies,[10] while the term variety is relegated to horticultural usage.[11] The nomenclature of the varietal categories is further complicated by the habit of some botanists, as Andersson,[12] Ascherson & Graebner,[13] Rouy,[14] and others to use binomial combinations for subspecies and races.

As the use of binomials for subdivisions of species is not admissible according to art. 28 of the Rules, all such combinations must be considered non-valid and must be credited to the first author who omits the intercalated generic name. This introduces the question of the correct author citation for trinomials and polynomials in regard to which opinions differ considerably. There can be, of course, no doubt that the change of the generic or the specific name in a trinomial constitutes a new combination, but there is apparently much difference of opinion whether 1° the shortening of a polynomial to a trinomial, 2° a change in the varietal category, as the change of a form to a variety, 3° the change of a symbol as numerals or letters to a definite category or vice versa and 4° the omission of the designation of the category or of the symbol, should be considered a new combination which calls for the citation of another author.

In regard to the first case it does not seem to constitute a violation of the Rules to quote the author of a polynomial for the trinomial, since the shortening of a polynomial into a trinomial is permissible according to art. 28, as discussed on p. 59. Neither need the author citation be changed if the case is reversed, as e. g. Pilger credits the combination *Plantago montana* subsp. *atrata* var. *euatrata* f. *elongata*[15] to Thellung, though Thellung published the name as *P. montana* f. *elongata*;[16] nor if the name is

[1] e. g. *Colutea arborescens microphylla* in Bot. Zeit. XXV. 291 (1867), and many instances in his Landwirthsch. Flora (1866).

[2] e. g. *Salix caprea alpestris* in Kong. Svensk. Vetensk. Akad. Handl. VI. pt. I. 77 (Monog. Salic.) (1867).

[3] e. g. *Cissus sicyoides oxyodon* in De Candolle, Monog. V. 525 (1887), in the text under e) *Balansae*, but *C. sicyoides* forma b *oxyodon* on p. 523.

[4] e. g. *Calophyllum brasiliense longifolium* Vesque, subsp. 2, in De Candolle, Monog. VIII 592 (1893).

[5] e. g. *Pinus nigra Poiretiana*, Syn. Mitteleur. Fl. ed. 2, I. 333 (1912).

[6] e. g. *Cyanea scabra longissima* Rock, var. nov., in his Monog. Study Hawaii. Lobel. 259 (1919).

[7] e. g. *Piper uncinatum leveyanum* Trelease, var. nov., in Jour. Wash. Acad. Sci. XIII. 367 (1923).

[8] e. g. *Ceratocephalus falcatus brachypetalus* in Monde des Pl. 1923, no. 27, p. 8.

[9] in Bull. Soc. Bot. France, LXXI. 151 (1924).

[10] e. g. *Sambucus pubens dissecta* Britton, Man. N. Stat. Canada 870 (1901).

[11] Canon 4 of the Philadelphia Code; see Bull. Torr. Bot. Club, XXXIV. 167 (1906).

[12] e. g. *Salix nigra* ** *S. amygdaloides* in Kong. Svensk. Vetensk. Akad. Handl. VI. pt. I. 21 (Monog. Salic.) (1867) and *S. grandifolia* 1. *S. pubescens*, l. c. 61.

[13] e. g. *Trifolium medium* Ia. *T. flexuosum* in their Syn. Mitteleur. Fl. VI. pt. II. 567 (1908).

[14] e. g. *Quercus pedunculata* sous-esp. *Q. Apennina* in his Fl. de France, XII. 312 (1910).

[15] in Rep. Spec. Nov. Reg. Veg. XXIII. 250 (1926).

[16] in Ber. Schweiz. Bot. Ges. XXIV–V. 235 (1916).

transferred to another subspecies or variety under the same binomial, as e. g. Zahn quotes G. Schneider for the combination *Hieracium alpinum* subsp. *alpinum* var. *pumilum* subvar. *normale* f. *setulosum*,[1] though Schneider published the combination as *H. alpinum* var. *melanocephalum* 4. *setulosum*.[2]

In the second case the answer depends chiefly on the fact whether we consider the various varietal categories as groups of different rank or of the same rank. Though the majority of botanists who follow the International Rules consider these categories as of different rank, there is apparently no definite statement to that effect in the Rules, neither in articles 10 to 13 in which the arrangement of subordinate groups of the plant kingdom is carried to 21 degrees nor in article 49 which deals with changes of rank and where nothing is said of the change of one subdivision of a species to another subdivision, but only the change of a species to a subdivision of a species or vice versa is mentioned. One source of the opinion that the different subordinate subdivisions of a species are of different rank may be the English translation of the Rules which employs the term rank for the term "degré" as used in the original French text in article 12 and 28 and also for "rang hiérarchique" as used in article 49. Some authors apparently consider the different subordinate subdivisions below the species as one nomenclatorial class and take the oldest name, whether published as a variety or form, but cite the change from a lower to a higher subdivision or vice versa as a new combination; e. g. Pampanini in proposing as new the combination *Gentiana verna* var. *magellanica*,[3] takes the oldest combination *G. verna* f. *magellanica* Rouniger (1916) and not *G. verna* var. *Tenoreana* Vaccari (1917) or var. *rexans* Fiori (1926), though he should have accepted var. *Tenoreana* as the oldest name published as a variety, if he had considered forma and varietas as constituting different ranks. I have discussed the same subject several years ago in this Journal (I. 46) proposing the term grade for the different degrees of varietal categories, and advocating the same course which Pampanini, took, but I am doubtful now if the author citation should be changed, as long as we do not consider these subdivisions as of different rank. A similar opinion was voiced by botanists of Harvard University in their proposed amendments to the Paris Code[4]: "Subspecies, varieties and forms are not sharply definable or mutually exclusive categories, it is therefore better that, although their separate rank is maintained for classificatory purposes their names should be regarded as forming a single nomenclatorial class." There is also to be considered that the term variety as used by one author may correspond to the subspecies of other authors, or as used by a certain author it may correspond to the term forma of other authors, or speaking generally the same term may mean different things

[1] in Engler Pflanzenr. IV. 280 (Hieracium) 624 (1921).
[2] in Oester. Bot. Zeitschr. XXXVII. 202 (1887).
[3] in Bull. Soc. Bot. Ital. 1926, p. 42.
[4] See p. 60, footnote 5.

with different authors, and different terms as used by different authors may mean the same thing.

In regard to the third case it may be stated that it is in many instances not clear which category the symbol represents; even the Greek letters which traditionally are taken to stand for varietas may stand for subspecies as in Persoon's Synopsis[1] and in Andersson's publications[2] who calls these subdivisions subspecies or modificationes primariae or more often formae, or for subvarietas or forma as used by Planchon,[3] while Roman letters may be employed for varieties. In many instances it is hardly possible to know whether in polynomials of which the subordinate subdivisions have only numerals and letters, the first subdivision is a subspecies and the following a variety or whether it is a variety and the following a subvariety or a form.

In regard to the fourth case it is to be considered that there are many instances in which the authors themselves have published the combination as a straight trinomial but with a definite statement as to the rank or grade[4] or in which they have published the combination as a modified trinomial, but later when they mention or cite the combination use it as a straight trinomial.[5] In such cases there can be, of course, no doubt that the author citations should be the same for both kinds of trinomials. But also in the other case when changing a straight trinomial to a modified one or vice versa, there seems to be little justification for changing the name of the author, for there is not even a change of rank or grade involved which might according to the prevailing interpretation of the International Rules call for a change of author citation. Nor are straight trinomials prohibited by the International Rules as some botanists seem to believe; the only passage which might be constructed that way reads "Not to publish a name . . . without expressing an opinion on the nature of the group to which they give the name," but that is only a recommendation (recom. XVIII) and not a rule.

It is often said that one should not make an author say what he did not say, and this is an excellent rule for citations of literature and synonyms and should be followed rigorously. There is no justification for citations of synonyms as they are given e. g. in the "North American Flora" where all trinomials are cited as straight trinomials and also otherwise the names are not cited exactly as originally published. A synonym should be cited exactly as published even without change of capitalization, gender or occasional misprints. We have, however, to distinguish between citation and use of a name or combination of names. If an author adopts or uses a certain name, it has to conform to the style of his work; if he considers

[1] See p. 58, footnote 1.

[2] in De Candolle Prodr. XVI. pt. II. 252 (1868); see also Kong. Svensk. Vetensk.-Akad. Handl. VI. no. I, 61, etc. (1867).

[3] e. g. *Ampelopsis heterophylla* var. *Bungei* subvar. *α. Sieboldii* in De Candolle, Monog. Phan. v. 456 (1887).

[4] See p. 61, footnotes 4, 6, 7.

[5] See p. 61, footnote 3.

e. g. *Evonymus* as of feminine gender, he has to change *E. alatus* Regel to *E. alata*, though this would not justify him to change the author citation. If he adopts the spelling Stigmaphyllum he has to write *Stigmaphyllum Selerianum* Niedenzu, though Niedenzu published the name as *Stigmatophyllon Selerianum*.[1] If he used definite designations for the different varietal categories he will have to make the change from numerals or letters in many combinations and will have to make other changes to make the names conform to the arrangement he adopted in his publication. These changes do not or should not call for a change in author citation, but yet they make an author say what he did not say. Only if we quote the name in the synonymy, are we able to give an exact citation, and it is only for citation in synonymy, that the rule can be strictly applied.

In changing a polynomial to a trinomial a certain difficulty is presented by polynomials like *Prunus glandulosa* var. *glabra* f. *Sieboldiana* subf. *rosea* Koehne[2] in which var. *glabra* represents the type of the species, f. *Sieboldiana* the type of var. *glabra* and subf. *rosea* the type of f. *Sieboldiana*. If we take the lowest subdivision for the trinomial, the type of the species would be called *P. glandulosa* subf. *rosea* or *P. glandulosa rosea;* if it is the intention to designate the group which includes both subforms *rosea* and *alba*, *P. glandulosa* f. *Sieboldiana* or *P. glandulosa Sieboldiana* would be the name; if we want a name for the group which includes both forms f. *Sieboldiana* and *f. albiplena*, *P. glandulosa* var. *glabra* or *P. glandulosa glabra* would be the proper name. This means that we have here three groups based on the same type, differing only in their narrower or wider circumscription or in other words in the exclusion of certain elements or the additions of new elements which according to art. 44 of the International Rules does not warrant a change in the name or names of the group. That groups based on the same type should have the same name, is also evident, if we accept the proposition that the different subordinate subdivision of a species should be considered as belonging to one nomenclatorial class. In many cases one of the names will be older than the others and that name will thus be the valid varietal name, but in the example cited above, all names or of the same age and in that case the author who first unites them chooses according to art. 46 of the Rules. Some authors in naming subordinate groups based on the same type have followed the method which seems to be the best and simplest, namely of using the same name for the subordinate groups as e. g. in the combination *Andropogon caricosus* subsp. *mollissimus β. mollissimus* Hackel.[3] In such a case the trinomial can be made to indicate the wider or narrower circumscription of the group by indicating the grade, for *A. caricosus* var. *mollissimus* would show that the group is taken in a narrower sense than *A. caricosus* subsp. *mollissimus*.

[1] in his Gen. Stigmatoph. II. 7 (1900).
[2] in Sargent, Pl. Wilson. I. 263 (1912).
[3] in De Candolle, Monog. VI. 569 (1889).

Considerable diversity of usage exists in the naming of the varietal categories representing the type of the species. Art. 28 rules that "names of subspecies and varieties are formed like specific names and follow them in order." Recommendation XXVIII. under art. 46 dealing with union of groups reads "When several species are united as subspecies or varieties under a collective name that subdivision which was first distinguished or described may retain its name (ex.: *Saxifraga aspera* subsp. *aspera*) or bear a prefix (*Alchemilla alpina* subsp. *eu-alpina*) or be designated by some customary title (normalis, genuinus, typicus, originarius, verus, veridicus)." Though this recommendation deals with the union of related species, it applies as well to the splitting of a polymorphous species into subordinate groups, since the resulting classification or taxonomic arrangement is the same whether it was arrived at from synthesis as in the former or from analysis as in the latter case. The prefix or the customary titles enumerated above may be given in the latter case to the typical group. A distinct name has its advantages when the phylogenetic type is not at the same time the nomenclatorial type of the species as is the case in many instances and is particularly evident in species based originally on a monstrosity as *Viburnum macrocephalum*, *Hydrangea macrophylla*, *Rosa Roxburghii*, *R. xanthina*, *R. hemisphaerica*. In such cases the normal form has been often distinguished as f. normalis or f. spontanea and the nomenclatorial type as f. plena or f. sterilis. Terms like typicus, verus, veridicus should be reserved for the nomenclatorial type. In this connection it may be pointed out that division 3 of article 51 which says that everyone should refuse to admit a name when it is based on a monstrosity, could be interpreted as invalidating the names mentioned above as they are without doubt based on monstrosities, though their validity has never been questioned. Even Uropedium Lindley mentioned as example under article 51 may be retained "charact. mutatis" as the oldest name for Phragmopedilum Rolfe.

Varieties of hybrids present another vexing question of nomenclature which is complicated by the custom of some botanists to give names, when using a formula for the designation of a hybrid, to forms of the hybrid and append them to the formula. This does not appear logical, for a varietal name presupposes the existence of a binomial to which it is to be attached, and besides, this practice is extremely confusing, as such a combination does not differ in appearance from a formula of which the second component is a binomial with a varietal name, e. g. *Salix caprea* × *daphnoides* var. *pulchra*[1] does not differ from *S. myrtilloides* × *repens* f. *submyrtilloides*,[2] though in the first case the varietal name stands for a variety of *S. daphnoides*, while in the second it represents a form of the hybrid. The wording of art. 34 of the International Rules might possibly be interpreted as allowing the use of a varietal name under a formula, but I do not think

[1] Gürke in Richter, Pl. Eur. II. 24 (1897).
[2] Abromeit in Schrift. Phys.-Oekon. Ges. Königsberg, XLVI. 68 (1905).

that this is the intention of the rule, since in the examples only a case of a binomial with a variety, namely × *Mentha villosa* β. *Lamarckii* is cited, and a formula of which the variety belongs to the second component, namely *Salix caprea* × *daphnoides* var. *pulchra*. To what utterly confusing nomenclature these formulas with varietal names attached may lead is shown by some combinations published by R. Keller who enumerates under *Rosa gallica* × *glauca* three forms A. *typica*, B1. *complicata* and B11. *myriodonta*,[1] based on *R. gallica* × *glauca* f. *typica*, var. *complicata* and var. *myriodonta*,[2] though in the latter case the varieties are varieties of *R. glauca*[3] and not of the hybrid. According to my opinion Keller's names can not be considered correct, since he used these varietal names in a different sense and for different plants; he should have given new varietal names, as he did correctly in other instances, e. g. with *R. coriifolia* var. *complicata* × *gallica* M. Schulze (l. c. 56) which he changed to *R. gallica* × *coriifolia* f. *complicatoides* (l. c. 290). There was, however, no justification for changing Schulze's *R. coriifolia* f. *typica* × *gallica* f. *aprica* (l. c. 55) to *R. gallica* × *coriifolia apricoides*, since Schulze's f. *aprica* is a form of the hybrid and not of *R. gallica*. If both kinds of combinations should be considered admissible under the Rules, there should be at least some sign or abbreviation inserted to distinguish between varietal names belonging to the last component of the formula and those representing a subdivision of the hybrid. The same proposition would apply to the author citation, since it is not always clear, whether the author cited belongs to the last name of the formula or to the formula as a whole, i. e. to the hybrid.

In regard to the supposed distinction between horticultural and botanical varieties or forms I refer to my remarks in the first volume of this Journal (p. 48) where I state, that I can find no fundamental difference between a form which originated in the wild and one which originated in a garden, but that there is a difference in the standing and in the use of fancy garden names and in that of botanical names.

Considering the great diversity in the attitude toward the varietal categories almost from the beginning of Linnaean nomenclature, it seems advisable to allow the greatest possible latitude in the use and employment of varietal names: e. g. that anyone who wants to use straight trinomials may do so and one who insists to attribute a distinct grade to a varietal subdivision may also do so, without having the right to change the name even if he assigns a distinct grade to a varietal category or changes a lower grade to a higher one or vice versa. I am also in favor of retaining the name of the original author, though I concede that in this respect there may be points in favor of the opposite opinion. Author citation, anyhow, is a matter of secondary importance and is of practical importance chiefly for the reason that it gives a more or less definite clue to the time and

[1] in Ascherson & Graebner, Syn. Mitteleur. Fl. VI. pt. I. 288 (1902).
[2] M. Schulze in Mitt. Geog. Ges. Jena, v. Bot. Ver. Gesamtthür. p. 51, 52 (1887).
[3] M. Schulze (l. c. 33, 34) attributes these combinations under *R. glauca* to Christ, but Christ published these varieties under *R. Reuteri* Godet.

place when or where the name was proposed and also enables one, if the name has been used twice or oftener for different plants, to state exactly which plant is meant by it. I do not think that much emphasis should be placed on sentimental reasons for the citation of authors' names, such as to give some measure of enduring recognition to the author who coined a new name or made a new combination; this sentimental and also the juridical aspect of nomenclature was stressed particularly by O. Kuntze and his often very acrimonious utterances in this respect discredited to a great extent his proposed reforms of botanical nomenclature in the eyes of many botanists and prejudiced them against their acceptance. Consideration of the practical significance of the authority should also lead, if an abbreviated author citation is desired or necessary, to abbreviate, a citation such as *Mikania Karsteniana* Klotzsch ex Hieronymus[1] to *M. Karsteniana* Hieron. rather than to *M. Karsteniana* Klotzsch, because the latter citation would infer that the name could be found in a publication by Klotzsch and furthermore that the name was published before 1860, while in reality it was published 40 years later. The fact that Klotzsch wrote the name some time before 1860 on a herbarium specimen is comparatively unimportant, while the fact that Hieronymus published the name in 1901 with a descriptive note is of much greater importance. We do not cite *Pinus inops* Aiton ex Bongard but *P. inops* Bong. when quoting the name as a synonym of *P. contorta* Dougl., though Bongard credited the name to Aiton. The citation *P. inops* Bong. in this case is to the point, but in the citation of literature, the names should be cited exactly as published and the full citation of this name should read: *Pinus inops* Aiton ex Bongard in Mém. Acad. Sci. St. Pétersb. ser. 6, II. 163 (1833) which shows at once that Bongard referred the plant, though erroneously, to *P. inops* Ait. and did not intend to describe a new species and therefore his name is not a homonym, but *P. inops* Ait. pro parte, quoad nomen, and it can not replace *P. contorta* Dougl. for the reason that *P. inops* Ait. is a synonym. Particularly in regard to the citation "Hort." the publishing author is of paramount importance, since "hort." does not give the slightest clue to time or place of the origin of the name; moreover it often happens that different plants may bear the same name in different gardens and only by citation of the publishing author we are able to know for which plant the name should stand.

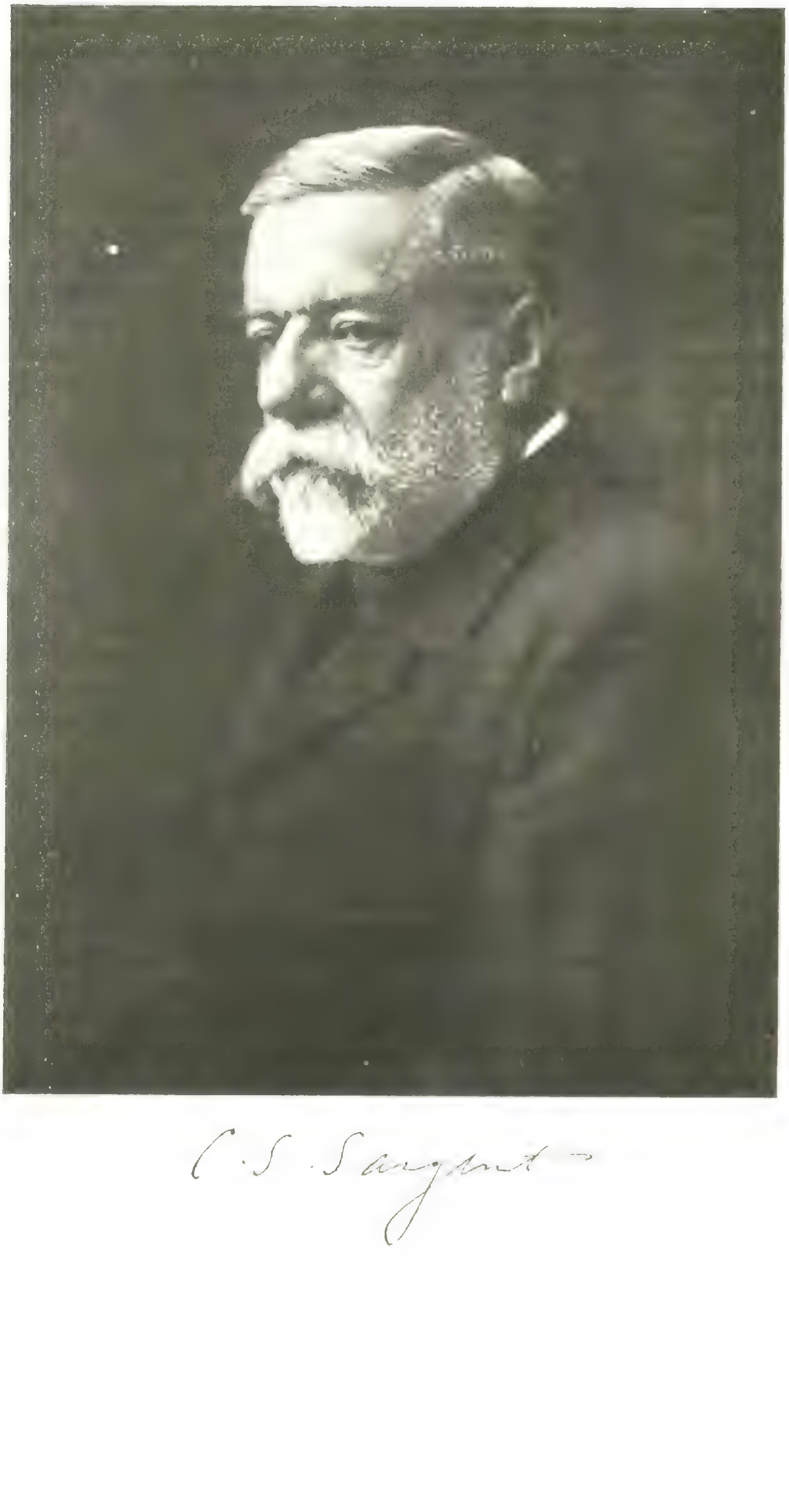
The suggestions made in the preceding pages regarding some modifications in the International Rules present no changes in the fundamental principles and the suggested modifications could be taken care of by changes in or additions to the recommendations and by additions of a few more examples to interpret more clearly the rules and recommendations which are admittedly vague in some instances and particularly so in respect to the nomenclature of varieties. This vagueness is possibly in some cases more or less intentional, since a stricter and clearer definition of disputed

[1] in Bot. Jahrb. XXVIII. 581 (1901).

points might have lead to endless discussion and jeopardized the general acceptance of the code by the International Congress. It would seem wise to relate the codification of general practices which may not meet with unanimous approval to recommendations rather than to rules, particularly as there exists no power to enforce the rules and even if there is some kind of retaliation against offenders possible, it is not used as it possibly might e. g. in regard to article 36^{bis} which rules that Latin diagnoses for new groups are obligatory. I doubt very much, if anyone would republish with Latin diagnoses and new names groups published by another author with descriptions in a modern language, that these names would be accepted, though according to a strict interpretation of the rules they should. The less opportunity is given by avoiding too much and too strict legislation, to disregard laws or rules, the easier it will be to win adherents to a certain code of nomenclature who will faithfully follow the rules and at the same time will be guided by the recommendation, even if they do not accept every single one of them.

NOTES

Pottsia grandiflora (see p. 15). When these pages were ready for the press, no. 89 of the Notizblatt of the Berlin Botanic Garden reached us with the description of *Pottsia grandiflora* Markgraf based on H. H. Hu's no. 1067 from southern Kiangsi. This on examination proved to be identical with the new species of Pottsia described on page 15 of this number by Dr. Merrill, who by a remarkable coincidence had selected the same name as Dr. Markgraf for this species.—A. R.



C. S. Sargent

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CHARLES SPRAGUE SARGENT

ALFRED REHDER

With Portrait

ON March twenty-second, Charles Sprague Sargent, for fifty-four years director of the Arnold Arboretum, died at his home "Holm Lea," Brookline, Mass., after a short illness in the eighty-sixth year of his age.

Charles Sprague Sargent was born in Boston on April 24th, 1841, the third child of Ignatius and Henrietta (Gray) Sargent. His father was a well-known merchant in the East India trade and a direct descendant in the fourth generation of William Sargent who probably came from England before 1678 and died in Gloucester, Massachusetts, in 1725. Charles prepared for College chiefly at E. S. Dixwell's School and graduated from Harvard in the class of 1862. In the following year, the civil war having started in 1861, he entered the military service of his country; he became First Lieutenant in the Second Louisiana Infantry and subsequently Aide-de-camp at the headquarters of the Department of the Gulf at New Orleans. On March 26th he was breveted Major of volunteers for "faithful and meritorios service" during the campaign against Mobile and on August 26th, 1865 he was honorably mustered out. After leaving military service he spent three years traveling in Europe and returned in the autumn of 1868 to take up the practice of horticulture and study of botany. In 1872 he became director of the Harvard Botanic Garden and was professor of horticulture during 1872 and 1873. On November 24, 1873 he was appointed director of the recently created Arnold Arboretum and served in both capacities until 1879, when he gave up the directorship of the Botanic Gardens to devote his entire time to the development of the Arnold Arboretum.

On November 26, 1873, he married Mary Allen Robeson, daughter of Andrew Robeson of Boston. She was an ideal companion and shared his tastes, his love of trees and of nature; she accompanied him in 1886 and 1887 on his cruises along the Florida coast for the exploration of the Florida Keys and went with him to Mexico. Being a skilful artist she painted the drawings illustrating the flowers and fruits of the trees represented in the collection of American woods prepared by Professor Sargent for the American Museum of Natural History in New York.

Almost all their married life was spent at their beautiful estate, Holm Lea, in Brookline where she presided as a charming hostess over a hospitable home. Her personality was pictured by Bishop Lawrence of Massachusetts at the time of her death which occurred on August 15, 1919, in these words: "Whenever she entered a room, be it drawing room filled with guests, a bedroom with a solitary invalid, or an institution filled with forlorn and wayward girls, the atmosphere was immediately charged with vitality, sympathy and cheer. She did not have to do or even say anything in order to be felt, her presence was enough; and her voice and deeds were the unconscious expression of a very warm heart and a very friendly spirit."

When in 1873 Sargent accepted the directorship of the new Arboretum, he found himself, as he stated later, "With a wornout farm, partly covered with natural plantations of native trees nearly ruined by excessive pasturage, to be developed into a scientific garden with less than $3000 available for that purpose, without equipment or the support and encouragement of the general public which then knew nothing about an arboretum or what it is expected to accomplish." On the other hand, there were assets such as groves of old trees which covered part of the land and particularly a rocky hill with steep cliffs and covered with a fine growth of old Hemlocks at the foot of which flowed a picturesque brook. These handicaps, however, did not discourage Sargent. As the income was entirely inadequate for the development of such a large area as a botanic garden, Sargent and Frederick Law Olmsted, who at that time was engaged in planning and constructing a park system for the city of Boston, conceived the plan of having the Arboretum used with certain restrictions as a part of the Boston park system. This plan met with little favor and was opposed by the governing Board of the College and the Park Commissioners of Boston, but finally the two men succeeded in convincing both parties of the advantage of such an arrangement and in 1882 an agreement was signed whereby the City of Boston took the land and leased it back to the College for one thousand years with the option of renewing the lease after the expiration of that term. By this agreement the City was to undertake the construction and maintenance of roads and paths, the protection and policing the grounds, while at the same time the property was relieved of the danger of taxation; the grounds themselves were given over to the College for the planting of a collection of trees and shrubs. In the meantime plants for the collection had been raised and propagated in the greenhouses of the adjoining Bussey Institution available for this purpose, but it was not possible to begin planting on a large scale until 1886, as the City was slow in building the roads and the gravel paths. The area which in 1882 was less than 150 acres was soon found to be too small for an arboretum on a large scale and additions were made several times until the Arboretum now covers 250 acres.

During 1879 and 1882 Sargent had, as an agent of the Tenth Census,

charge of the investigation of the forests and forest resources of the United States. The results of these investigations are incorporated in a volume published as a part of the Tenth Census. This was the first important effort to bring together the facts in regard to American forests and furnished for many years the chief data on our forest resources. During his travels in connection with this work he visited all the important forested regions and made a large collection of specimens which formed the first important contribution to the herbarium he had started in 1878. He also brought together a remarkable collection of wood specimens of the American trees. This collection named the Jesup collection for Mr. Morris K. Jesup who provided the funds for it, is now in the Natural History Museum of New York and a duplicate set at the Arnold Arboretum.

In 1882 he was approached by Professor Spencer F. Baird to undertake the preparation of a Silva of North America to be published by the Smithsonian Institution, but when the work was started it became apparent that, the way the payments by the Smithsonian Institution were arranged, it would take at least seventy-five years to finish the work. Therefore, Sargent made another arrangement and engaged Charles E. Faxon, who had already shown great ability as a botanical artist, to prepare the plates; at the same time Faxon took charge of the herbarium and the library of the Arboretum. The first volume of this monumental work of fourteen folio volumes was ready in 1891 and the last of the 740 plates appeared just twenty-one years after Faxon had made the first drawing. The copper plates were engraved under the direction of the French artists Riocreux and Picart famous for their excellent plant portraits. The text shows the thoroughness and painstaking care characteristic of Sargent's work; of each species complete references to literature and synonyms and a detailed botanical description are given, followed by copious notes of general, economic and horticultural interest.

In 1882 and 1883 he was a member of the Northern Pacific Transcontinental Survey; during this survey the magnificent and extensive glaciers in northern Montana were discovered and Sargent advocated having this region declared a national park on account of its scenic grandeur, but nearly thirty years elapsed before it was set aside as Glacier Park by act of Congress.

In 1884 Sargent acted as chairman of the commission to investigate for the State of New York the Adirondack forests and to establish a conservation policy. In the winter and spring of 1885 with C. E. Faxon he visited some of the West Indian Islands to study the tropical and subtropical trees identical with those of southern Florida. In 1886 and 1887 he undertook several cruises along the Florida coast on the United States lighthouse tender Laurel placed at his disposal by the government for the purpose of studying the arboreal vegetation of the Florida Keys; he was accompanied by Mrs. Sargent and Messrs. J. M. Codman and C. E. Faxon. During one of these cruises in the spring of 1886 he discovered a new genus of Palm,

Pseudophoenix Sargentii, later found to be identical with a species growing on the Bahamas, though not before recognized as a new genus. In 1887 he traveled in Mexico and collected chiefly near Saltillo and Monterey.

In 1888 he started *Garden and Forest*, a magazine chiefly devoted to forestry, horticulture and botany, which he conducted for ten years until it was discontinued in 1897. Through this magazine he endeavored to rouse public interest in the preservation of the forests and in the inauguration of a definite forest policy, he advocated the creation of national parks and tried to awaken a deeper interest in horticulture and landscape gardening and in plants in their different aspects.

In 1892 he had the satisfaction of moving the library, the herbarium, and the offices of the Arboretum which had been kept up to that time in a private house in Brookline into a brick building erected for this purpose in the Arboretum grounds and for which Mr. H. H. Hunnewell, a devoted friend of the Arboretum, had furnished the money; later a new wing was added to provide room for the rapidly increasing herbarium.

In the same year Sargent visited Japan to study the forest flora of that country, bringing back a large number of specimens and many seeds of trees and shrubs new to American gardens. His observations he recorded in his "Forest Flora of Japan" first published in *Garden and Forest* in 1893 and later issued separately. There for the first time a comprehensive account of the trees and shrubs of Japan could be found with excellent illustrations of many of the more important species.

About 1900 Sargent began the study of the genus Crataegus as represented in America to which he devoted much of his time during the following twenty years; he described about 730 new species and introduced the larger part of them into cultivation. The Hawthorn plantation now forms a prominent feature of the Arboretum.

In 1902 he started a new publication under the title "Trees and Shrubs" in which new and noteworthy species were figured and described. Two volumes containing 200 plates were published, the last part appearing in 1913.

In 1903 Sargent undertook a tour around the world accompanied by his son Robeson Sargent and, during the first part of his journey, by John Muir, the well known Californian naturalist and author. He went first to Europe and visited London, Paris, Holland, Berlin and Leningrad; from Leningrad he made a short journey into Finland and then to the Crimea and Transcaucasia. Crossing the range of the Caucasus he reached Moscow and from there he traveled on the Trans-Siberian Railway to Manchuria and then to Peking where he was able to visit the Forbidden City. From China he went to Singapore and Java where he visited the famous botanical garden at Buitenzorg. He returned by the way of Japan and San Francisco bringing with him large botanical collections for the Arboretum including many seeds of trees and shrubs new to American gardens.

In 1905 he published his "Manual of the Trees of North America"

which might be characterized as an edition of his "Silva" condensed into one volume, with figures of all the North American trees known up to that time; a second edition came out in 1922 and a second reprint with corrections in 1926.

During the winter of 1905 to 1906 he traveled with his son Robeson in South America and collected chiefly in Peru and Chile. He went through the Straits of Magellan where he was delayed several weeks in the most southern town of the world. On account of this delay he had to give up his intended visit to the Argentine and returned home by way of the Falkland Islands, Rio, Cape Verde Islands and Lisbon.

From 1911 to 1917 he edited Plantae Wilsonianae in three volumes in which the extensive collection made by E. H. Wilson in China for the Arboretum was recorded and many new species described. In 1911 he also started to publish the *Arnold Arboretum bulletin of popular information* which was issued during spring and autumn and intended to give to the public general information on the more important and noteworthy trees and shrubs growing in the Arboretum. In 1919 the quarterly *Journal of the Arnold Arboretum* was started, intended chiefly for the more technically botanical papers prepared at the Arboretum.

About the middle of January 1924 Sargent was stricken by a severe attack of herpes, followed by intestinal grippe, which held him confined to the house for more than three months. After this he never regained his former strength, though he was able to attend to his duties and to come to the Arboretum regularly almost every day up to March 5th of this year. Feeling ill on that day he had to leave his office earlier than usual never to return. After an illness of seventeen days he passed away at six o'clock in the evening of March twenty-second.

He is survived by four children: Mrs. Guy Lowell (Henrietta Sargent), Mrs. Nathaniel Bowditch Potter (Mary Sargent), Mr. Charles S. Sargent, who is in the banking business in New York, and Miss Alice Sargent, who lived with her father. Another son, Andrew Robeson Sargent, died in 1918; he was a successful landscape gardener, associated with his brother-in-law Guy Lowell, the architect. Mrs. Sargent died in 1919.

Sargent was a man of strong personality; he was tall, of athletic build and like his father and great-grandfather of shy, retiring disposition, a man of few words, averse to public speaking and, though professor of arboriculture, he never lectured. He was an indefatigable worker, set in his purpose and slow to change his opinion. To those who knew him little his manner might have appeared abrupt or often aloof, but those who knew him better were aware that he had a warm heart. It was not easy to win his confidence, but those whom he trusted could trust in him. At home, in congenial company and among his friends he would unbend and though rarely taking a leading part would enter into the spirit of the company. Toward ladies he had a charming deferential manner which won him many friends. He always enjoyed, up to his illness three years ago, perfect health and lightly carried occasional hardships during his travels.

Sargent's one outstanding achievement was the creation and upbuilding of the Arnold Arboretum. Little did the men who placed on his hands an old wornout farm and an income of a few thousand dollars think that he would succeed in building up an institution which now ranks among the foremost botanic gardens and is the only large institution in the world devoted entirely to the study of trees and shrubs, with one of the richest botanical libraries and with a large herbarium more complete and richer than others in the representation of the ligneous flora of this country and of eastern Asia, so that for many years it has attracted besides others, Chinese and Japanese students who can study here the native flora of their countries to better advantage than in their own country. In the living collection Sargent always took the greatest interest and he himself gathered many seeds during his travels in this country and abroad by which he enriched it with new and rare trees and shrubs. He kept up connections with all important botanic gardens and nurseries in this country and in Europe and sent collectors to regions where plants grew that could be expected to thrive in the climate of Massachusetts. A catalogue of the trees and shrubs growing in the Arboretum was a work he undertook only a short time before his death, and in which he showed much interest until the very last, but fate did not allow him to finish this task.

The library was perhaps that department of the Arnold Arboretum with which he had the closest personal connection. It was begun as his own private botanical library in 1873 and had grown to 6000 volumes when it was transferred in 1892 to the new administration building and presented to the University. But with this presentation his care for it did not cease and he continued to increase it at his own expense, so that the library as it stands now containing more than 37000 volumes and 8400 pamphlets is almost entirely his gift to the Arboretum.

In the herbarium which served as a base for his monumental work the "Silva of North America" he was always much interested and during the last years even more so than before. He had made plans to carry out his idea of making the herbarium the representative herbarium of the ligneous flora of the world and there were already last year several collectors in the field for the Arboretum collecting in remote quarters of the world. He himself had collected extensively in this country and on his various journeys abroad. Collectors for the Arboretum were sent out and large collections bought or acquired by exchange, so that the building erected for it in 1909 is already inadequate, for an herbarium of woody plants including the numerous, often bulky fruit specimens and samples of wood requires much more space than an ordinary herbarium.

In the development of a definite forest policy for the United States Sargent played an important and leading part. When it was realized in the early seventies that the timber supply of the country, long considered inexhaustible, showed signs of depletion, an agitation set in for the planting of trees particularly on the prairies and Sargent reported in 1875 and

1878 to the Massachusetts State Board of Agriculture on the planting of trees. This agitation caused the government of the United States to authorize a special study of the forests of the country in connection with the Tenth Census of 1880. Sargent was made chairman of a commission appointed for this purpose. He with other members of the commission visited and studied the most important forest areas of the country and published the results of this study in a comprehensive report published as a separate volume of the Tenth Census. This report contains a description of the forests of the country, a survey of the existing supply of standing timber, facts regarding the forest industries, a statement concerning the destruction of forests by fire and a summary of the existing information on the character and the quality of the different commercial woods. This report has remained for many years the chief source of information regarding the forests of the country. In 1884 he was appointed by the State of New York chairman of a commission to study the Adirondack forests which were in danger of ruthless exploitation. This report in which he outlined a definite forest policy for the State served as a basis for the establishment of a State Forest preserve and thus saved the Adirondack and Catskill forests for the people of New York. In *Garden and Forest*, a magazine he published from 1888 to 1897 he published numerous editorials and articles discussing forestry problems in order to educate the public, awaken its interest and arouse it to action on public questions relating to forestry. Among the more important discussions may be mentioned: the adoption of a definite national forest policy, the withdrawal of the public forests from further disposal to private individuals, their temporary patrol by the army against forest fires and depredations, the appointment of a commission to prepare a plan for the administration of public properties, the service of forests in watershed protection, the need of courses in forestry in the higher educational institutions. When in 1896 Congress had authorized the National Academy of Sciences to make an investigation and report on the inauguration of a national forest policy for the forested lands of the United States, the Academy appointed Sargent chairman of a committee on this question. The members of the committee visited the West to obtain first hand knowledge of the public forests. As a result of their report President Cleveland set aside new forest reservations in addition to the few already established under the Act of Congress of March 3, 1891, aggregating in all more than twenty million acres. This action met with strong opposition and protest in the West, and when President McKinley took office he was hard pressed to annul the actions of his predecessor who had signed the proclamation concerning the reservations just before the completion of his office. The committee of the National Academy urged the President to stand firm against this pressure and Sargent had a long interview with the President with the result that the latter decided to take no action in the matter and let the reservations stand. The President stated afterwards that he had intended to return the reservations to the

public domain thus making them available for private exploitation before the conference with the committee and its chairman changed his mind. Sargent also strongly advocated the creation of national parks. Already in 1883 he recommended setting aside the glacier region in northern Montana as a national park, which was finally done nearly 30 years later by an act of Congress. In 1897 he recommended that funds be raised to save at least some remnants of the noble Redwood forests on the Pacific coast which also was done many years later.

Sargent's contributions to horticulture and to American horticulture in particular are various and many. Of the greatest importance is, without doubt, the introduction of a very large number of trees and shrubs into American gardens and into cultivation generally, chiefly from eastern Asia as a result of his own journeys and the expeditions sent out by the Arboretum. The number of trees and shrubs introduced to this country by the Arboretum is more than 1000 and those first introduced into cultivation number about 790 besides 570 new species of Crataegus. Among those introductions which have gained great popularity may be mentioned the Japanese Barberry, *Berberis Thunbergii*, which is now found in almost every garden, Kaempfer's Azalea, *Rhododendron obtusum* var. *Kaempferi*, the hardiest of the Indian Azaleas, and *Clematis paniculata*, one of the most striking autumn-flowering vines. Also the introduction of a hardy race of the Cedar of Lebanon merits mention. Sargent's translation into English of the book on tree pruning by Des Cars and the practical application by him of the principles laid down in that work to the old Oaks in the Arboretum and their subsequent rejuvenation has done much to bring the advantages of correct and scientific tree pruning before the public. At Holm Lea, his beautiful estate of about 180 acres in Brookline, one of the finest estates in this part of the country, he set a splendid example to garden and plant lovers and influenced landscape gardening throughout New England and beyond. His garden was particularly famous for a large collection of fine plants of Indian Azaleas which made a wonderful display when in bloom. These and the Rhododendrons, the Lilacs, Wistarias and other plants attracted thousands when he threw his grounds open to the public on certain days in the spring. In collaboration with his friend H. H. Hunnewell he has made the cultivation of Rhododendrons popular in New England by showing that it is possible to grow them successfully even in this rather severe climate. As vice-president of the Massachusetts Horticultural Society and trustee for fifty-four years and president for twenty-eight years of the Massachusetts Society for the promotion of agriculture he exerted great influence on the progress of horticulture. Through the "*Arnold Arboretum Bulletin of popular information*" which he published from 1911 until his death, he made the treasures of the Arboretum known to a large circle of readers and induced them to try in their gardens the many beautiful trees and shrubs of recent introduction.

Of Sargent's contributions to botany his monumental work "The Silva of North America" published in fourteen folio volumes with 740 plates easily takes first rank, but a wider circle of students of the North American forest flora was reached by his "Manual of the trees of North America" which in fact is a condensed "Silva" brought up to date: in its second edition published in 1922 there are 783 trees illustrated. One of the most important contributions to American botany is his work on American Hawthorns; between 1901 and 1923 he published numerous papers on Crataegus describing about 730 new species and revising the Crataegus flora of certain regions. He also was especially interested in American species of Tilia, Quercus, Aesculus and Carya and other trees; he wrote several papers dealing with these genera and described many new species. He also furthered greatly our knowledge of the flora of the Far East. He gave in his "Forest Flora of Japan" a comprehensive account of the forest flora of Japan, but it is with the flora of China that his name is most intimately connected; he sent collectors to different part of China to gather herbarium specimens and seeds. Among these collectors E. H. Wilson easily ranks first, and to record and describe the plants he brought back, Sargent published "Plantae Wilsonianae" a work of three volumes which is one of the most important contributions to the flora of China. The *Journal of the Arnold Arboretum* edited by him since 1919 also contains many papers concerning the flora of eastern Asia chiefly based on the herbarium of the Arboretum. For bringing together in that herbarium such a good representation of the flora of eastern Asia, the students of that rich flora are greatly indebted to him. The herbarium and the library of the Arnold Arboretum are monuments of his foresight which will be appreciated even more in the future than they are at present.

Sargent also found time for public service in other fields. He was Park Commissioner of the Town of Brookline, Trustee of the Museum of Fine Arts of Boston and of the Brookline Library, he held offices in some corporations and was a member of several clubs.

Many honors were bestowed upon Sargent during his long and active life. He was fellow of the American Academy of Arts and Sciences, member of the National Academy of Sciences, American Philosophical Society, St. Louis Academy of Sciences, Société botanique de France, Société nationale d'horticulture de France, foreign member of the Linnean Society of London, corresponding member of the Academy of National Sciences of Philadelphia, Botanical Society of Edinburgh, Société centrale forestière de Belgique, honorary member of the California Academy of Sciences, Royal Irish Academy of Dublin, Botanical Society of Tokyo, Société nationale d'agriculture de France, Deutsche dendrologische Gesellschaft, Forestry Society of Finland, Dendrological Society of Prague, Scottish Arboricultural Society, Société nationale d'acclimatation de France, English Rhododendron Society, Garden Club of America, Women's National Garden and Farm Association of America. In 1907 he received from Harvard

University the degree of LL.D. In 1910 the first award of the George Robert White medal, intended for the man who did most to advance the cause of horticulture during the year, was made to him by the trustees of the Massachusetts Horticultural Society. In 1920 the Garden Club of America presented its first medal of honorary award to him in recognition of his services to horticulture in general and to the gardens of America in particular. In 1923 he was given the Frank N. Meyer Horticultural medal by the American Genetic Association for "distinguished service in the field of foreign plant introduction." In the following year the Loder Rhododendron cup of the Royal Horticultural Society of England went to him, the first time that the cup had been sent out of Europe. Several books have been dedicated to him, as the 137th volume of the *Botanical Magazine*, E. H. Wilson's "The Romance of our trees," A. Rehder's "Manual of cultivated trees and shrubs" and the first volume (not yet published) of H. H. Hu's "Icones plantarum sinicarum." Many plants have been named in his honor: *Sargentia* S. Wats., a Mexican tree belonging to the Rutaceae with one species *S. Greggii* S. Wats.; *Sargentodoxa* Rehd. & Wils., constituting the family of Sargentodoxaceae, with one species *S. cuneata* Rehd. & Wils.; *Sargentiella* Koehne, a subsection of Prunus; and the following species and varieties: *Aesculus glabra* var. *Sargentii* Rehd., *Berberis Sargentiana* Schneid., *Campylotropis Sargentiana* Schindl., *Clematis Simsii* var. *Sargentii* Rehd., *Crataegus Sargentii* Beadle, *Cupressus Sargentii* Jeps., *Eryeibe Sargentii* Merr., *Eugenia Sargentii* Merr., *Evonymus Sargentii* Loes. & Rehd., *Ficus Sargentii* Merr., *Fraxinus Sargentiana* Lingelsh., *Hydrangea Sargentiana* Rehd., *Juniperus chinensis* var. *Sargentii* Henry, *Lonicera Sargentii* Rehd., *Magnolia Sargentiana* Rehd. & Wils., *Malus Sargentii* Rehd., *Omphalea Sargentii* Merr., *Philadelphus incanus* var. *Sargentianus* Koehne, *Picea Sargentiana* Rehd. & Wils., *Populus Sargentii* Dode, *Prunus Sargentii* Rehd., *Pseudophoenix Sargentii* H. Wendl., *Quercus Sargentii* Rehd., *Rhamnus Sargentianus* Schneid., *Rhododendron Sargentianum* Rehd. & Wils., *Sorbus Sargentiana* Koehne, *Sorbus Sargentii* Dipp., *Spiraea Sargentiana* Rehd., *Syringa Sargentiana* Schneid. and *Viburnum Sargentii* Koehne. Also garden forms of Rhododendron, Syringa and Rosa, genera in which he had been much interested from a horticultural point of view have been named for him and members of his family.

Endowed with a strong personality he devoted a long life to his chosen work and well fulfilled the duties laid upon him. He has passed from us leaving a monument than which none could be more inspiring. The trees he planted will keep his memory green and his name will live as long as the Arnold Arboretum stands.

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"Reprinted from *Journal of the Arnold Arboretum*," 1926, vii, 1–21.

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AN ENUMERATION OF THE LIGNEOUS PLANTS OF ANHWEI

ALFRED REHDER AND ERNEST H. WILSON

THE Chinese province of Anhwei has remained botanically almost a terra incognita until recent years. In Hemsley's Index flores sinensis published between 1886 and 1904 Anhwei is mentioned only a few times and in H. H. Chung's Catalogue of trees and shrubs of China the name occurs hardly at all. The botanical exploration of this province did not start until it was taken in hand by the botanical departments of the University of Nanking and of the National Southeastern University of the same city, and almost all the plants enumerated below were collected between 1922 and 1925 in the southern part of the province by various collectors of these two institutions.

Anhwei is situated between 115° and 120° E. Long. and 29° and 34° N. Lat. and borders east on Kiangsu and Chekiang and west on Honan, Hupeh and Kiangsi. It is traversed by the Huai and the Yangtze River. The central and southern part is mountainous; the mountain ranges run approximately from southwest to northeast and the highest peaks probably do not much exceed 5000 feet in altitude.

The specimens enumerated below are all in the herbaria of the Arnold Arboretum and of the University of California; we are indebted to Dr. E. D. Merrill for the loan of all the woody Anhwei plants of the last named herbarium which enabled us to give a fairly complete enumeration of the trees and shrubs known at present from Anhwei. The specimens collected by R. C. Ching are with few exceptions represented in the herbarium of this institution, while those of other collectors are in the herbarium of the University of California with some duplicates in our herbarium.

GINKGOACEAE

Determined by E. H. WILSON

Ginkgo biloba Linnaeus, Mant. alt. 313 (1771).—Miquel in Siebold & Zuccarini, Fl. Jap. II. 73, t. 136 (1870).—Rehder & Wilson in Sargent, Pl. Wilson. II. 1 (1914), where citations of literature and synonymy are given.

Salisburia adiantifolia Smith in Trans. Linn. Soc. III. 330 (1797).

Wang shan, alt. 850 m. *R. C. Ching*, no. 3058, July 20, 1925 (a large tree, fairly common in villages).

TAXACEAE

Determined by E. H. WILSON

Cephalotaxus Fortunei Hooker in Bot. Mag. LXXVI. t. 4499 (1850).—Wilson in Jour. Arnold Arb. VII. 39 (1926), where full citations of literature and synonymy are given.

Chu hwa shan, *R. C. Ching*, no. 2592, April 28, 1925 (tree 8 m. tall, girth of trunk 0.6 m.); Chu hwa shan, Chi yuen sze, alt. 1000 m., *A. N.*

Steward, no. 1124, Herb. Univ. Nanking no. 5253, April 24, 1924 (tree 3 m. tall); Wang shan, alt. 600 m., *A. N. Steward*, no. 1335, Herb. Univ. Nanking no. 7206, August 12, 1924, (tree 7 m. tall); Wang shan, woods, alt. 600 m., *K. Ling*, no. 1214, Herb. Univ. Nanking no. 7775, August 12, 1924, (tree 10 m. tall).

Cephalotaxus drupacea, var. **sinensis** Rehder & Wilson in Sargent, Pl. Wilson. II. 3 (1914).—Rehder in Jour. Arnold Arb. IV. 118 (1923).

Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2769, June 26, 1925 (tree 11 m. tall, bark brownish and fibrous).

Torreya grandis Fortune in Gard. Chron. 1857, 788; 1860, 170.—Gard. Chron. 1858, 588, fig.

Wang shan, alt. 1400 m., *R. C. Ching*, no. 3036, July 25, 1925 (tree 8 m. tall); same locality, alt. 1100 m., *A. N. Steward*, no. 1271, Herb. Univ. Nanking no. 7143, August 10, 1924; same locality, alt. 1100 m., *K. Ling*, no. 1166, Herb. Univ. Nanking no. 7741, August 9, 1924 (tree 10 m. tall, bark peeling in thin scales, fruit edible); Kimen, alt. 400 m., *K. Ling*, no. 1275, Herb. Univ. Nanking no. 7817, August 18, 1924, (tree 13 m. tall, girth of trunk 0.4 m.); Wu yuan, alt. 800 m., *N. K. Ip*, no. 51, Herb. Univ. Nanking no. 7674, August 19, 1924, (tree 16 m. tall, girth of trunk 0.4 m.); Kau toun, Tai ping hsien, alt. 160 m., *R. C. Ching*, no. 2883, July 3, 1925 (tree 15 m., bark gray, fibrous; rare).

Apparently the common tree in Anhwei Province; the fruits vary very considerably in size.

Taxus chinensis Rehder in Jour. Arnold Arb. I. 51 (1919); IV. 119 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. 34, fig. (1923).

Taxus cuspidata var. *chinensis* Rehder & Wilson in Sargent, Pl. Wilson. II. 8 (1914), where full synonymy is given.

Chu hwa shan, *R. C. Ching*, no. 2622, Herb. Univ. Nanking no. 7549, April 29, 1925, (tree 4 m. tall, rare); Chemen, alt. 100 m., *R. C. Ching*, no. 3168, August 1925 (tree 20 m. tall, girth of trunk 1.5 m.); Simin, alt. 260 m., *R. C. Ching*, no. 3264, August 21, 1925 (tree 20 m. tall, girth of trunk 1 m.); Wang shan, alt. 600 m., *K. Ling*, nos. 1215, 1372, Herb. Univ. Nanking nos. 7776 and 7894, August 12, 27, 1924 (tree 20 m. tall, girth of trunk 0.5 m.); Tai ping hsien, Tan chai chiao, Wang shan, *A. J. Bowen*, no. 3, Herb. Univ. Nanking no. 12084, November 29, 1925 (tree 10 m. tall, girth of trunk 2 m.).

Podocarpus macrophyllus D. Don in Lambert, Descr. Pinus, II. 22 (1824); ed. minor, II. 143, (1832).—Miquel in Siebold & Zuccarini, Fl. Jap. II. 70, t. 133 (1870).—Wilson, Conif. Tax. Jap. 3 (1916).

Chemen, alt. 260 m., *R. C. Ching*, no. 3124, August 5, 1925 (tree 9 m. tall, girth of trunk 0.5 m., bark dark gray, rare).

PINACEAE

Determined by E. H. Wilson

Pinus Massoniana Lambert, Descr. Pinus, I. 17, t. 12 (1803); ed. 2, I. 16, t. 8 (1828); ed. minor, 20, t. 8 (1832).—Shaw in Sargent, Pl. Wilson. I. 1, (1912); II. 14 (1914).

Chu hwa shan, *R. C. Ching*, no. 2653, May 1, 1925; Wang shan, alt. 2100 m., *K. Ling*, no. 1229, Herb. Univ. Nanking no. 7786, Aug. 12, 1924, (shrub 2 m. tall).

Pinus tabulaeformis Carrière, Traité Conif. ed. 2, 510 (1867).—Rehder in Jour. Arnold Arb. VII. 22 (1926).

Pinus sinensis Mayr, Fremdl. Wald. & Parkb. 349, fig. 113 (1906) in part.—Shaw in Sargent, Pl. Wilson. II. 15, (1914); Gen. Pinus, 60, t. 23, fig. 201–207 (1914).

Wang shan, alt. 1400 m., *R. C. Ching*, nos. 3009 and 3038, July 1925 (tree 10–12 m. tall, girth of trunk 1.5–2 m.); Chu hwa shan, Chi yuen sze, alt. 1000 m., *A. N. Steward*, no. 1127, Herb. Univ. Nanking no. 5256, April 24, 1924, (tree 7 m. tall).

Pseudolarix amabilis Rehder in Jour. Arnold Arb. I. 53 (1919).

Abies Kaempferi Lindley in Gard. Chron. 1854, 255, 455, fig.

Pseudolarix Kaempferi Gordon, Pinetum, 292, (1858).—Rehder & Wilson in Sargent, Pl. Wilson. II. 21 (1914), where full citations of literature and synonymy are given.

Pseudolarix Fortunei Mayr, Monog. Abiet. Jap. 99, (1890).—Hemsley in Bot. Mag. CXXXIV. t. 8176 (1908).

Chu hwa shan, *R. C. Ching*, no. 2637, Herb. Univ. Nanking no. 7565, May 1, 1925 (tree 20 m. tall, girth of trunk 1.3 m., common); Wang shan alt. 475 m., *R. C. Ching*, no. 3077, July 21, 1925.

Tsuga chinensis Pritzel in Bot. Jahrb. XXIX. 217 (1900).—Chun, Chin. Econ. Trees, 22, fig. 7 (1922).—Wilson in Jour. Arnold Arb. VII. 50 (1926) where full synonymy is given.

Wang shan, alt. 1400–1500 m., R. C. Ching, nos. 2995 and 3018, July 1925, (tree 13–15 m. tall, girth of trunk 1 m., bark gray, rough); same locality, alt. 2300 m., near summit of mountain, *Y. M. Kwoh*, no. 1, Herb. Univ. Nanking no. 12082, November 10, 1925 (tree 6 m. tall, girth of trunk 1.3 m.); same locality, alt. 1200 m., *K. Ling*, no. 1219, Herb. Univ. Nanking no. 7779, August 12, 1924, (tree 17 m. tall, girth of trunk 2.25 m., a solitary tree).

Pseudotsuga sinensis Dode in Bull. Soc. Dendr. France, 1912, 58, fig.—Wilson in Jour. Arnold Arb. VII. 52 (1926).

Wang shan, south side, alt. 810 m., *R. C. Ching*, no. 3059, July 20, 1925 (tree 20 m. tall, girth of trunk 1.5 m., bark gray, fissured, rare); same locality, alt. 1200 m., *A. N. Steward*, no. 7195, August 1924; same locality, alt. 1200 m., *K. Ling*, no. 1218, Herb. Univ. Nanking no. 7778, August 12, 1924 (tree 20 m. tall, girth of trunk 2.25 m.).

Cunninghamia lanceolata Hooker in Bot. Mag. LIV. t. 2743 (1827).—Rehder & Wilson in Sargent, Pl. Wilson. II. 50 (1914), where full citations of literature and synonymy are given.

Cunninghamia sinensis Brown apud Richard, Conif. 80, t. 18, fig. 3 (1826).

Chu hwa shan, Chi yuen sze, alt. 1000 m., *A. N. Steward*, no. 1139, Herb. Univ. Nanking no. 5268, April 24, 1924 (tree 7 m. tall).

Cryptomeria japonica D. Don in Trans. Linn. Soc. XVIII. 167, t. 13, fig. 1 (1841).—Wilson, Conif. Tax. Jap. 66, tt. 48–49 (1916), where complete references to literature and synonymy and a full account of this tree will be found.

Cupressus japonica Linnaeus f., suppl. 421 (1781).

South Siunin, alt. 130 m., R. C. Ching, no. 3326, Sept. 7, 1925 (tree 23 m. tall, girth of trunk 2 m. in open wood, rare).

Thuja orientalis Linnaeus, Spec. 1002 (1753).—Rehder & Wilson in Sargent, Pl. Wilson. II. 53 (1914), where full citations of literature and synonymy are given.

Wang shan, alt. 700 m., *R. C. Ching*, no. 3030, July 15, 1925 (tree 10 m. tall, cultivated); Li shan, Chemen, alt. 230 m., *R. C. Ching*, no. 3136, August 5, 1925, (shrub 2 m. tall, cultivated).

Juniperus formosana Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 209, t. 38 (Fl. Mont. Formos.) (1908); Icon. Pl. Formos. VII. 39, fig. 25 (1918).—Wilson in Jour. Arnold Arb. VII. 64 (1926), where full citations of literature and synonymy are given.

Chu hwa shan, *R. C. Ching*, no. 2582, Herb. Univ. Nanking no. 7508, May 1, 1925, (tree 6 m. tall, bark brownish gray, rough, peeling off in thin plates); without locality, *R. C. Ching*, no. 3023, 1925; Wang shan, alt. 1450 m., *A. N. Steward*, no. 1285, Herb. Univ. Nanking no. 7157, August 11, 1924 (tree 2 m. tall); same locality, alt. 1350 m., rocky places, *K. Ling*, no. 1182, Herb. Univ. Nanking no. 7726, August 11, 1924 (tree 2½ m. tall, branches pendulous).

Juniperus squamata var. **Fargesii** Rehder & Wilson in Sargent, Pl. Wilson. II. 259 (1914).—Rehder in Jour. Arnold Arb. IV. 126 (1923).

Wang shan, alt. 1400 m., *R. C. Ching*, no. 3049, July 17, 1925, (tree 10 m. tall); Chang gon shan, alt. 800 m., *R. C. Ching*, no. 3226, August 16, 1925, (tree 8 m. tall, girth of trunk 0.75 m.).

Juniperus chinensis Linnaeus, Mant. 127 (1767).—Miquel in Siebold & Zuccarini, Fl. Jap. II. 58, t. 126, 127, fig. 1, 2, 4 (1870).—Rehder & Wilson in Sargent, Pl. Wilson. II. 60 (1914), where full citations of literature and synonymy are given.

Chemen, alt. 230 m., *R. C. Ching*, no. 3125, August 5, 1925 (shrub 2.5 m. tall; temple garden).

GRAMINEAE

Determined by ALFRED REHDER

Arundinaria dumetosa Rendle in Sargent, Pl. Wilson. II. 63 (1914).

Shu ling hsien, *K. Ling*, Herb. Univ. Nanking no. 7832, August 20, 1924.

As the specimen consists only of a sterile branch with two leaves, the identification is open to doubt; the leaves are up to 35 cm. long and to 7 cm. broad.

Arundinaria brevipaniculata Handel-Mazzetti, Pl. Nov. Sin. Forts. 6, p. 1 (Anz. Akad. Wiss. Wien, no. 19) (1920).

Chu hwa shan, *A. N. Steward*, Herb. Univ. Nanking, no. 5252, April 24, 1924; Wang shan, *K. Ling*, Herb. Univ. Nanking no. 7781, August 12, 1924; Hangchow, *C. Y. Chiao*, Herb. Univ. Nanking no. 7979, April 30, 1925.

Phyllostachys bambusoides Siebold & Zuccarini in Abh. Akad. Wiss. Münch. III. 745, t. 5, fig. 3 (1843).—Houzeau de Lehaie in Act. Congr. Intern. Bot. Bruxelles, II. 196, t. 48–51 (1912).—Camus, Bambus. 56, t. 27, fig. A (1913).

South of Chu hwa shan, cultivated, *R. C. Ching*, no. 2892, July 3, 1925.

Phyllostachys puberula Munro in Gard. Chron. n. ser. VI. 774 (1876).—Houzeau de Lehaie in Act. Congr. Intern. Bot. Bruxelles, II. 220, t. 52–54 (1910).—Camus, Bambus. 57, t. 28, fig. 8 (1913).

Phyllostachys Henonis Mitford, Bamboo Gard. 149 (1896).—Stapf in Hooker's Icon. XXVII. t. 2614 (1899).

Chu hwa shan, *W. A. Macklin*, Herb. Univ. Nanking, nos. 7423, 7425, May 25, 1923.

Phyllostachys nidularia Munro in Gard. Chron. n. ser. VI. 773, 774 (1876).—Camus, Bambus. 63, t. 36, fig. A (1913).

Chu hwa shan, *W. A. Macklin*, Herb. Univ. Nanking nos. 7424, and 7426, May 25, 1923; *A. N. Steward*, Herb. Univ. Nanking no. 5263, April 24, 1924; *R. C. Ching*, no. 2640, Herb. Univ. Nanking no. 7568, May 1, 1925 (3 m. tall, stems 1.2 cm. in diam.); north of Chu hwa shan, cultivated, *R. C. Ching*, no. 2709, Herb. Univ. Nanking no. 7636, May 3, 1925 (5 m. tall, stems 2 cm. in diam.).

Phyllostachys kumasasa Munro in Trans. Linn. Soc. XXVI. 39 (1868), "*P. kumasaca*."—Mitford, Bamboo Gard. 162 (1896).

Bambusa kumasasa Zollinger, Syst. Verz. Ind. Archip. Pflanz. 57 (1854), nom. nudum.—Steudel, Syn. Pl. Glum. 331 (1855).—Miquel, Fl. Ind. Bot. III. 419 (185), "*B. kumasaca*."

Phyllostachys ruscifolia Hort. Kew in Hand-list Arb. Kew, II. 259 (1896).—Camus, Bambus. 63, t. 31, fig. B (1913), *P. kumasaca*.

Shibataea kumasasa Makino in Tokyo Bot. Mag. XXVIII. 22 (1914).

Ma chi, alt. 400 m., on open hillside, *R. C. Ching*, no. 3211 (sterile, 2 m. tall).

This species has apparently not yet been recorded from China. Munro when transferring Zollinger's and Steudel's specific name to Phyllostachys unfortunately changed it to kumasaca, whether he did it intentionally or whether it is a mistake is not quite clear. On p. 39 he cites *Bambusa kumasaca* Zoll. as a synonym but on p. 37 he speaks of *B. kumasasa* of Zollinger and states that Siebold says that the Japanese call all the herbaceous Bamboos "Sasa."

LILIACEAE

Determined by A. REHDER

Smilax herbacea L. var. **acuminata** Wright in Jour. Linn. Soc. XXXVI. 97 (1903).

Wang shan, alt. 800 m., *A. N. Steward*, no. 1338, Herb. Univ. Nanking no. 7209, August 14, 1924; Chu hwa shan, Erh sun tien, alt. 400 m., *R. C. Ching*, no. 4021, Herb. Univ. Nanking no. 8421, June 26, 1925; Wu yuan, alt. 800 m., *R. C. Ching*, no. 4480, Herb. Univ. Nanking no. 8859, August 16, 1925.

Smilax glabra Roxburg, Fl. Ind. ed. 2, III. 792 (1832).—Seeman, Bot. Voy. Herald, 420, t. 100 (1852 57).

South of Chemen, alt. 130 m., open thickets, *R. C. Ching*, no. 4434, Herb. Univ. Nanking no. 8815, August 13, 1925.

Smilax china Linnaeus, Spec. 1029 (1753).—Norton in Sargent, Pl. Wilson. III. 4 (1916).

Chu chow, *L. F. Tsu*, Herb. Univ. Nanking no. 146, April 13, 1921; Suchow fu, *S. N. Lei*, Herb. Univ. Nanking, no. 2980, September 25, 1922; Chu hwa shan, in open thickets, *R. C. Ching*, no. 2805, June 28, 1925 (height 10 m.); Chang gon shan, Wu yuan, in open thickets, alt. 750 m., *R. C. Ching*, no. 3240, August 17, 1923 (height 10 m.).

The berries of Ching's nos. 2805 and 3240 are unusually large measuring about 12 mm. in diameter, while those of Lei's specimen from Suchow fu measure only 6–7 mm. in diameter.

Smilax china var. **brachypoda,** var. nov.

A typo recedit foliis magis coriaceis, minoribus, petiolis brevibus circiter 5 mm. longis, stipulis petiolos fere aequilongis in auriculam circiter dimidio latam quam longam dilatatis, cirrhis tenuibus saepe rudimentariis, pedunculis brevioribus, baccis minoribus 5–6 mm. diam.—Frutex scandens, 2–3 m. altus (fide Ching), ramulis angulatis et striatis aculeatis. Folia pleraque late elliptica, rarius elliptica vel anguste elliptica, 3–5.5 cm. longa et 1.5–3.5 lata, apice abrupte breviter acuminata acumine recurvo, basi abrupte contracta et late cuneata vel fere rotundata, subcoriacea, trinervia, nervis lateralibus supra vix visibilibus subtus leviter elevatis; stipulae petiolo paullulo breviores, circiter 5 mm. longae et 2–3 mm. latae, in turionibus 1 cm. longae et ad 5 mm. latae.

Pedunculi fructiferi circiter 1 cm. longi; pedicelli 5 mm. longi; bacca in sicco lutea, 5–6 mm. diam.

ANHWEI: Wang si che, Chu hwa shan, in open thicket along stream, alt. 600 m., *R. C. Ching*, no. 2874, June 30, 1925.

KIANGSI: Siu feng sze, Lu shan, *A. N. Steward*, August 12, 1922, Herb. Univ. Nanking no. 2649 (type).

CHEKIANG: vicinity of Ningpo, *D. Macgregor*, 1908 (flowers); Tai chou, alt. 10 m., *R. C. Ching*, no. 1298, April 3, 1924.

This variety is smaller in all parts than typical *S. china* L. and its leaves are leathery and thicker and less prominently veined. In its large stipules nearly as long as the short petioles it resembles *S. discotis* Warb. but that species differs in the larger and usually narrower leaves subcordate or sometimes rounded at base, of thinner texture and glaucous beneath, and in the bluish black fruits on longer peduncles. The variety looks quite distinct from typical *S. china* and might be considered a distinct species, but some specimens of the variable *S. china* approach it and therefore it seems better to refer it as a variety to that species.

Smilax glauco-china Warburg in Bot. Jahrb. XXIX. 255 (1900).

Chu hwa shan, Chi yuen sze, *A. N. Steward*, Herb. Univ. Nanking, no. 5265, April 24, 1924; Chu hwa shan, open places in the valley, *R. C. Ching*, no. 2649, Herb. Univ. Nanking no. 7577, May 1, 1925 (height 7 m.); Chu chow, *L. F. Tsu*, Herb. Univ. Nanking, no. 146, April 13, 1921; Chu chow, Lang yah tze, *A. N. Steward*, Herb. Univ. Nanking no. 5448, October 27, 1923; Wang shan, rocky gorge, alt. 1300 m., *A. N. Steward*, Herb. Univ. Nanking, no. 7154, August 11, 1924.

CHLORANTHACEAE

Determined by A. REHDER

Chloranthus spicatus (Thunb.) Makino in Tokyo Bot. Mag. XVI. 180 (1902).

Chloranthus inconspicuus Swartz in Phil. Trans. LXXVIII. 359, t. 15 (1787).

Wu yuan, alt. 630 m., *N. K. Ip*, no. 56, Herb. Univ. Nanking no. 7679, August 19, 1924.

SALICACEAE

Determined by A. REHDER

Populus adenopoda Maximowicz in Bull. Soc. Nat. Moscou, LIV. 50 (1879).—Schneider in Sargent, Pl. Wilson. III. 23 (1916).

Chu hwa shan, exposed hillside, *R. C. Ching*, no. 2596, Herb. Univ. Nanking no. 7521, April 28, 1925 (tree 16 m. tall, diam. of trunk 25 cm.).

Salix Wilsonii Seemen in Bot. Jahrb. XXXVI. beibl. LXXXII. 28 (1905).—Schneider in Sargent, Pl. Wilson. III, 40 (1916).

Heh hsien, alt. 800 m., *K. Ling*, no. 1254, Herb. Univ. Nanking no. 7800, August 14, 1924; foot of Chu hwa shan, open moist places, *R. C.*

Ching, no. 2717, Herb. Univ. Nanking no. 7551, May 3, 1925 (tree 25 m. tall); same locality, alt. 300 m., *R. C. Ching*, no. 2756, June 26, 1925 (tree 15 m. tall).

Salix Matsudana Koidzumi in Tokyo Bot. Mag. XXIX. 312 (1915).—Schneider in Sargent, Pl. Wilson, III. 107 (1916).—Chun, Chin. Econ. Trees, 49, t. 15 (1923).

Chu hwa shan, open places, *R. C. Ching*, no. 2652, May 1, 1925 (tree 12 m. tall, of graceful appearance).

Ching's specimen differs from the type in its somewhat longer style, but agrees otherwise with *S. Matsudana*.

MYRICACEAE

Determined by A. REHDER

Myrica rubra Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 230 (Fl. Jap. Fam. Nat. II. 106) (1846).—Shirasawa, Icon. Ess. For. Jap. II. t. 6, fig. 12–23 (1908).

Myrica nagi C. De Candolle, Prodr. XVI. pt. II. 151 (1864).—Non Thunberg.

Li kau, west of Chemen, in open thickets, alt. 115 m., *R. C. Ching*, no. 3162, August 7, 1925 (shrub 10 m. tall); Wu yuan, alt. 240 m., *R. C. Ching*, no. 3285, August 29, 1925 (shrub, 12 m. tall).

JUGLANDACEAE

Determined by A. REHDER

Platycarya strobilacea Siebold & Zuccarini in Abh. Akad. Münch. III. 742, t. 5, fig. 1 (1843).—Miquel in Siebold & Zuccarini, Fl. Jap. II. 87, t. 149 (1870).—Shirasawa, Icon. Ess. For. Jap. I. t. 17, fig. 16–29 (1900).

Wang shan, on the way to Lion Ridge, alt. 600 m., *R. C. Ching*, no. 2973, July 12, 1925 (tree 20 m.).

Pterocarya Paliurus Batalin in Act. Hort. Petrop. XIII. 101 (1893).—Chun, Chin. Econ. Trees, 64, t. 21 (1923).

Wang shan, *K. Ling*, no. 1238, Herb. Univ. Nanking no. 7792, August 13, 1924; Chu hwa shan, in woods, alt. 600 m., *R. C. Ching*, nos. 2629 and 2796, April 30 and June 28, 1925 (tree 27 m. tall).

Juglans cathayensis Dode in Bull. Soc. Dendr. France, 1909, 47, fig.; in Fedde Rep. Spec. Nov. X. 298 (1911).—Wilson in Gard. Chron. ser. 3, L. 189, fig. 88, t. (1911).

Chu hwa shan, in woods, *R. C. Ching*, no. 2631, Herb. Univ. Nanking no. 7559, April 30, 1925 (tree 28 m. tall).

BETULACEAE

Determined by A. REHDER

Carpinus cordata Bl. var. **chinensis** Franchet in Jour. de Bot. XIII. 202 (1899).—Winkler in Engler, Pflanzenr. IV.–61, 27 (1904).—Schneider, Ill. Handb. Laubholzk. II. 282, fig. 558 f (1912).

Nin tai, Chu hwa shan, in woods, alt. 1150 m., *R. C. Ching*, no. 2861, June 29, 1925 (tree 22 m. tall); Wang shan, in woods, alt. 1280 m., *R. C. Ching*, no. 3047, July 17, 1925 (tree 12 m. tall).

Carpinus laxiflora var. **Fargesii** Burkill in Jour. Linn. Soc. Bot. XXVI. 501 (1899).

Carpinus Fargesii Franchet in Jour. de Bot. XIII. 202 (1899).—Schneider, Ill. Handb. Laubholzk. II. 894, fig. 558 d, 559 q (1912).

Chang gon shan, Wu yuan, in woods, alt. 720 m., *R. C. Ching*, nos. 3220 and 3225, August 16, 1925 (trees 13 m. and 23 m. tall).

I refer these two specimens chiefly on account of their ovate subcordate leaves and on account of the bracts being not or inconspicuously lobed on their outer side with some hesitation to this variety of which I have seen no material from the type locality.

Carpinus laxiflora var. **macrostachya** Oliver in Hooker's Icon. Pl. XX. t. 1989 (1891).—Winkler in Engler, Pflanzenr. IV.–61, 33 (1904).

Chu hwa shan, in woods and bamboo groves, *R. C. Ching*, no. 2801, June 28, 1925 (tree 13 m. tall); Chang gon shan, Wu yan hsien, dense wood, *R. C. Ching*, no. 3215, August 16, 1925 (tree 20 m. tall); south Siu nin, open wood, alt. 420 m., *R. C. Ching*, no. 3323, September 7, 1925 (tree 13 m. tall); without locality and date, *R. C. Ching*, no. 2729 (flowering branch).

Carpinus laxiflora var. **Davidii** Franchet in Jour. de Bot. XIII. 203 (1899).

Wu yuan, *N. K. Ip*, Herb. Univ. Nanking no. 7692, August 22, 1924; *K. Ling*, same date, Herb. Univ. Nanking no. 7844; Li kau, Chemen, alt. 260 m., *R. C. Ching*, no. 3174, August 8, 1925 (26 m. tall; bark gray, smooth).

This variety differs chiefly in its narrower generally oblong-lanceolate leaves rounded to broad-cuneate at base and of firmer subcoriaceous texture and in its bracts being distinctly lobed on each side at base.

Carpinus Tschonoskii Maximowicz in Mél. Biol. XI. 313 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 534 (1882).—Winkler in Engler, Pflanzenr. IV–61, 36, fig. 10 m. (1904).—Schneider in Sargent, Pl. Wilson. III. 441 (1916).

Carpinus yedoensis Maximowicz in Mél. Biol. XI. 314 (1881); in Bull. Acad. Sci. St. Pétersb. XXVII. 535 (1882).—Shirasawa, Icon. Ess. For. Jap. II. t. 11, fig. 1–18 (1908).

Chang gon shan, west Wu yuan, woods, alt. 720 m., *R. C. Ching*, no. 3219, August 16, 1925 (tree 21 m. tall).

Corylus heterophylla var. **sutchuenensis** Franchet in Jour. de Bot. XIII. 129 (1899).

Wang shan, top of mountain, alt. 2000 m., *K. Ling*, no. 1205, August 12, 1924, Herb. Univ. Nanking no. 9614.

Betula luminifera Winkler in Engler, Planzenr. IV.–61, 91, fig. 23 a-c (1904).—Schneider, Ill. Handb. Laubholzk. II. 882, fig. 552 d, 553 g-h (1912); in Sargent, Pl. Wilson, III. 455 (1916).

Wu yuan, alt. 900 m., *N. K. Ip*, no. 61, Herb. Univ. Nanking no. 7683, August 20, 1924; Wang shan, woods, alt. 580 m., *R. C. Ching*, no. 2936, July 11, 1925 (tree 13 m. tall); Chang gon shan, Wu yuan, woods alt. 600 m., *R. C. Ching*, no. 3238, August 17, 1925 (tree 20 m. tall).

Ip's specimen from Wu yen represents a form with densely pubescent young branchlets and petioles and leaves pubescent on both sides, while the other two specimens are glabrescent.

Alnus Jackii Hu in Jour. Arnold Arb. VI. 140 (1925).

Tai ping hsien, partially shaded wood, alt. 1220 m., *R. C. Ching*, no. 2889, July 3, 1925 (tree of medium size, only one seen).

The leaves of this specimen are considerably larger than those of the type, measuring up to 11 cm. in length and 6 cm. in width, on petioles up to 2.5 cm. long; the peduncles of the strobiles are 1–2 cm. long.

FAGACEAE

Determined by E. H. WILSON

Fagus longipetiolata Seemen in Bot. Jahrb. XXIII. Beibl. LVII. 56 (1897).—Rehder & Wilson in Sargent, Pl. Wilson. III. 190 (1916).

Fagus sylvatica var. *longipes* Oliver in Hooker's Icon. XX. t. 1936, in textu (1890).

Fagus sinensis Oliver, l.c., in tabula tantum (1890).

Chang gon shan, west Wu yuan, alt. 750 m. in woods, *R. C. Ching*, no. 3216, August 16, 1925 (tree 26 m. tall, girth of trunk 2 m., bark smooth, chalky white, fairly common).

Fagus Engleriana Seemen apud Diels in Bot. Jahrb. XXIX. 285, fig. a-d (1900).—Rehder & Wilson in Sargent, Pl. Wilson. III. 191 (1916).

Wang shan, alt. 1100 m. in woods, *R. C. Ching*, no. 2967, July 12, 1925 (tree 11 m. tall, girth of trunk 0.6 m., bark dark gray, common).

Castanea Seguinii Dode in Bull. Soc. Dendr. France, 1908, 152, fig.—Rehder & Wilson in Sargent, Pl. Wilson. III. 194 (1916), where full synonymy and citations of literature are given.

Chu hwa shan, *R. C. Ching*, nos. 2699 and 2748, May 2, 1925 and June 25, 1925 (bush 0.6–1.3 m. tall; common); Tientai, alt. 1300 m., *R. C. Ching*, no. 2855, June 29, 1925 (tree 20 m. tall, girth of trunk 2 m., bark gray, deeply fissured); Wang shan, alt. 1400 m. woods and open thickets, *R. C. Ching*, no. 3042, July 17, 1925 (tree 15 m. tall, girth of trunk 0.6 m., bark gray, rough).

Castanea Henryi Rehder & Wilson in Sargent, Pl. Wilson. III. 196 (1916), where full synonymy and citations of literature are given.

Castanopsis Henryi Skan in Jour. Linn. Soc. XXVI. 523 (1899).

Castanea Fargesii Dode in Bull. Soc. Dendr. France, 1908, 158, fig.

Chu hwa shan, *R. C. Ching*, no. 2654, May 1, 1925 (tree 21 m. tall, girth of trunk 2 m., bark gray fissured, common); without locality, *R. C. Ching*, no. 4101, 1925; Shu ling hsien, *K. Ling*, Herb. Univ. Nanking no. 7835, August 21, 1924 (tree 10 m. tall, girth of trunk 0.9 m., bark rough, fissured).

Castanopsis Fargesii Franchet in Jour. de Bot. XIII. 195 (1899).—Rehder & Wilson in Sargent, Pl. Wilson. III. 198 (1916).

Chemen, alt. 100 m., woods, *R. C. Ching*, no. 3175, August 8, 1925, (tree 30 m. tall, girth of trunk 2.3 m., bark light gray, common).

Castanopsis caudata Franchet in Nouv. Arch. Mus. Paris, sér. 3, VII. 87 (Pl. David. I. 277) (1884).—Rehder & Wilson in Sargent, Pl. Wilson. III. 201 (1916).

Chu hwa shan, alt. 650 m., ravines, *R. C. Ching*, no. 2811, June 28, 1925, (tree, 11 m. tall, rare); Wang shan, alt. 600 m., woods, *R. C. Ching*, no. 2905, July 5, 1925 (tree 15 m. tall, girth of trunk 0.6 m., bark dark gray, fissured); same locality, alt. 700 m., *K. Ling*, Herb. Univ. Nanking no. 7725, August 9, 1924, (tree 20 m. tall, girth of trunk 0.9 m., bark shallowly furrowed).

Castanopsis sclerophylla Schottky in Bot. Jahrb. XLVII. 638 (1912).—Rehder & Wilson in Sargent, Pl. Wilson. III. 201 (1916), where full synonymy and citations of literature are given.

Quercus sclerophylla Lindley in Lindley & Paxton, Flower Gard. I. 59, fig. 37 (1850–51).

Chu hwa shan, hillsides, *R. C. Ching*, no. 2663, May 2, 1925, (tree 18 m. tall, girth of trunk 1.75 m., bark gray, rough, splitting into plates, fruit edible; common); Wu yuan, alt. 450 m., woods, *K. Ling*, Herb. Univ. Nanking nos. 7840, 7841, 7842 and 7880, August 22, 25, 1924 (tree 10–18 m. tall, girth of trunk 0.45–1.8 m., bark scaling off).

Castanopsis Delavayi Franchet in Jour. de Bot. XIII. 194 (1899).—Skan in Jour. Linn. Soc. XXVI. 523 (1899).

Wu yuan, alt. 130 m., *R. C. Ching*, no. 3283, August 29, 1925, (tree 20 m. tall, girth of trunk 1 m.); Wang shan, alt. 530 m., top of mountains, *K. Ling*, Herb. Univ. Nanking no. 9621, August 18, 1924, (tree 20 m. tall, girth of trunk 0.6 m.).

It is a long way from western Yunnan to the Anhwei localities cited above but the two specimens before me agree very closely to the Yunnan material and I cannot refer them elsewhere. The pubescent shoots at once distinguish this tree from *C. sclerophylla* Schottky, the most closely related species. The collector notes that it is comparatively rare.

Quercus aliena Blume, Mus. Bot. Lugd.-Bat. I. 298 (1850).—Shirasawa, Icon. Ess. For. Jap. I. 55, t. 28, fig. 12–22 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. III. 214 (1916), where full synonymy and citations of literature are given.

West Chemen, alt. 100 m., *R. C. Ching*, no. 3192, August 9, 1925, (shrub 6 m. tall, common.); Ching yang hsien, hillside, *K. Ling*, Herb. Univ. Nanking no. 7291, April 22, 1924.

Quercus Stewardii Rehder in Jour. Arnold Arb. VI. 207 (1925).

Wang shan, alt. 1450 m., woods and thickets, *R. C. Ching*, no. 3043, July 17, 1925 (tree 10 m., girth of trunk 0.75 m., bark gray, rough, common); same locality, alt. 2000 m., *A. N. Steward*, no. 1311, type, August 1924, *K. Ling*, Herb. Univ. Nanking no. 9613, August 12, 1924.

Quercus Fabri Hance in Jour. Linn. Soc. X. 202 (1869).—Rehder & Wilson in Sargent, Pl. Wilson. III. 216 (1916), where full citations of literature are given.

Chu pu, alt. 330 m., *N. K. Ip*, Herb. Univ. Nanking no. 5132, August 12, 1923 (tree 20 m. tall, girth of trunk 1 m.).

Quercus serrata Thunberg, Fl. Jap. 176 (1784).—Koidzumi in Tokyo Bot. Mag. XXXIX. 313 (1925).—Non Siebold & Zuccarini et al.

Quercus glandulifera Blume, Mus. Bot. Lugd.-Bat. I. 295 (1850).—Shirasawa, Icon. Ess. For. Jap. I. 50, t. 26, fig. 13–24 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. III. 212 (1916), where complete citations of literature are given.

Chu hwa shan, Chi yuen sze, alt. 330 m., *A. N. Steward*, Herb. Univ. Nanking no. 5264, April 24, 1924, (shrub 1–2 m. tall); Wu yuan, alt. 1060 m., *N. K. Ip*, Herb. Univ. Nanking no. 7678, August 19, 1924; South Siunin, alt. 100 m., *R. C. Ching*, no. 3316, September 7, 1925 (tree 13 m. tall, girth of trunk 1 m., bark dark gray, deeply fissured, fairly common).

Koidzumi has examined Thunberg's original specimen and finds it is identical with the plant named *Q. glandulifera* by Blume, who has been followed by all subsequent authors. More recently Nakai has confirmed Koidzumi's observation. The species of Quercus nearly all authors have considered to be *Q. serrata* Thunberg must now be known as *Q. acutissima* Carruthers.

Quercus Chenii Nakai in Jour. Arnold Arb. V. 74 (1924).

Wu yuan, alt. 650 m., *R. C. Ching*, no. 3309, September 4, 1925 (tree 20 m. tall, girth of trunk 1–2 m.; common); east of Kweichow City, alt. 160 m., *R. C. Ching*, no. 3337, September 10, 1925 (tree 16 m. tall, girth of trunk 3 m., common).

These very complete specimens show that this is a good species.

Quercus acutissima Carruthers in Jour. Linn. Soc. VI. 33 (1862).—Nakai in Tokyo Bot. Mag. XXIX. 57 (1915).

Quercus serrata Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 226 (Fl. Jap. Fam. Nat. II. 102) (1846).—Blume, Mus. Bot. Lugd.-Bat. I. 296 (1849–51).—Shirasawa, Icon. Ess. For. Jap. I. t. 26, fig. 1–12 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. III. 217 (1916).—Non Thunberg.

West of Kweichou city, alt. 130 m. tall, *R. C. Ching*, no. 3341, September 10, 1925, (tree 26 m. tall, girth of trunk 2–5 m.; rare).

Quercus variabilis Blume, Mus. Bot. Lugd.-Bat. I. 297 (1850).—Shirasawa, Icon. Ess. For. Jap. I. 54, t. 28, fig. 1–11 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. III. 219 (1916), where complete synonymy and citations of literature are given.

Chu hwa shan, *R. C. Ching*, no. 2602, April 28, 1925 (tree 33 m. tall, girth of trunk 1.57 m.; common); east of Kweichou City, alt. 160 m., *R. C. Ching*, no. 3336, September 10, 1925, (tree 26 m. tall, girth of trunk 2.5 m., bark gray; rare).

Quercus myrsinaefolia Blume, Mus. Bot. Lugd.-Bat. I. 305 (1850).—Rehder & Wilson in Sargent, Pl. Wilson. III. 236 (1916), where full synonymy and citations of literature are given.

Quercus Vibrayeana Franchet & Sovatier, Enum. Pl. Jap. I. 449 (1875).—Shirasawa, Icon. Ess. For. Jap. I. 55, t. 29, fig. 16–31 (1900).

Chu hwa shan, *R. C. Ching*, no. 2634, April 30, 1925 (tree 26 m. tall, girth of trunk 2–3 m.); Li shan, northwest Chemen, alt. 330 m., *R. C. Ching*, no. 3144, August 6, 1925, (tree 20 m. tall, girth of trunk 2–3 m., bark gray, smooth; rare); Chang gon shan, Wu yuan, alt. 500 m. tall, *R. C. Ching*, no. 3224, August 16, 1925, (tree 20 m. tall, girth of trunk 1 m., bark gray, common).

Quercus glauca Thunberg, Fl. Jap. 175 (1784).—Banks, Icon. Kaempfer, t. 17 (1791).—Shirasawa, Icon. Ess. For. Jap. I. 56, t. 30, fig. 13–24 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. III. 226 (1916), where full synonymy and citations of literature are given.

Quercus annulata Smith in Rees, Cyclop. XXIX. no. 22 (1819).—Brandis, Forest Fl. Ind. 487, t. 65 (1874).

Chu hwa shan, *R. C. Ching*, no. 2620B, April 29, 1925, (tree 20 m. tall, girth of trunk 1.3 m.; common); Tien t'ai shan, alt. 900 m., *A. N. Steward*, Herb. Univ. Nanking no. 5298, April 25, 1924.—Wang shan, alt. 1200 m., *K. Ling*, Herb. Univ. Nanking no. 7773, August 12, 1924 (tree 13 m. tall, girth of trunk 0.9 m.); Wu yuan, *K. Ling*, Herb. Univ. Nanking nos. 7849 and 7869, August 23 and 24, 1924 (tree 10 m. tall, girth of trunk 0.75 m.).

In this species the leaves vary greatly in size and in texture.

Quercus glauca f. **gracilis** Rehder & Wilson in Sargent, Pl. Wilson. III. 228 (1916).

Wang shan south side, alt. 900 m., *R. C. Ching*, no. 3061, July 20, 1925 (tree 15 m. tall, girth of trunk 1 m.; very common); Wang shan, forests, alt. 1800 m., *K. Ling*, Herb. Univ. Nanking no. 7748, August 11, 1924, (tree 6 m. tall, girth of trunk 0.35 m.); same locality, above Tze kuan sze, forests, alt. 1550 m., *A. N. Steward*, Herb. Univ. Nanking no. 7167, August 11, 1924, (tree 10 m. tall, girth of trunk 0.45 m.).

Quercus spathulata Seemen in Bot. Jahrb. XXIII. Beibl. no. LVII. 49 (1897).—Rehder & Wilson in Sargent, Pl. Wilson. III. 226 (1916).

The material we have seen from Anwhei of this species represents a distinct variety which we have named:

Quercus spathulata var. **oxyphylla** Wilson, n. var.

A typo recedit foliis oblongo-lanceolatis vel lanceolatis 5–9 cm. longis et 2–3.5 cm. latis acutis mucronulatis versus apicem sparse dentatis vel integris.

Li shan, Chemen, alt. 200 m., woods, *R. C. Ching*, no. 3116, August 5, 1925, (tree 22 m. tall, girth of trunk 1.3 m., bark dark gray).

The acute oblong-lanceolate leaves, entire or with few teeth at the apex give this variety a very distinct appearance but the pubescence on the leaves and branches and the character of the cupular scales are identical with those of the type. Having in mind how great is the variation in foliage among all the evergreen prickly leaved Oaks as witnessed *Q. Ilex* Linn. I am satisfied that the difference is more obvious than real. According to the collector the material came from a large specimen, much larger than any I have knowledge of in Hupeh and Szechuan where the species is widely scattered though not common.

Lithocarpus cleistocarpa Rehder & Wilson in Sargent, Pl. Wilson. III. 205 (1916).

Quercus cleistocarpa Seemen in Bot. Jahrb. XXIII. Beibl. no. 57, 52 (1897).

Li shan, Chemen, alt. 1300 m., *R. C. Ching*, no. 3112, August 5, 1925, (tree 10 m. tall, bark dark gray, rough); Maich, alt. 960 m., *R. C. Ching*, no. 3208, August 15, 1925, (tree 20 m. tall, girth of trunk 1 m., bark gray, smooth); Kimen hsien, mountain top, alt. 950 m., *K. Ling*, Herb. Univ. Nanking no. 7824, August 19, 1924.

Lithocarpus Henryi Rehder & Wilson in Sargent, Pl. Wilson. III. 209 (1916).

Quercus Henryi Seemen in Bot. Jahrb. XXIII. Beibl. no. LVII. 50 (1897).

Wang che, Chu hwa shan, south, valleys, alt. 650 m., *R. C. Ching*, no. 2839, June 29, 1925 (tree 17 m. tall, girth of trunk 1 m., bark gray, smooth); Wang shan, alt. 360 m., *R. C. Ching*, no. 3055, July 20, 1925 (tree 15 m. tall, girth of trunk 1 m., bark gray); Wang shan, below Yuen ku sze, open forests, alt. 1000 m., *A. N. Steward*, Herb. Univ. Nanking no. 7205, August 12, 1924, (tree 10–15 m. tall, girth of trunk 1 m.); Wang shan, open places, *K. Ling*, Herb. Univ. Nanking no. 7774, August 12, 1924, (tree 15 m. tall, girth of trunk 1.15 m., bark gray, peeling off in thin shreads).

Lithocarpus glabra Rehder in Baily, Stand. Cycl. Hort. VI. 3569 (1917); in Jour. Arnold Arb. I. 126 (1919).

Quercus glabra Thunberg, Fl. Jap. 175 (1784); Icon. Pl. Jap. IV. t. 5 (1802).—Shirasawa, Icon. Ess. For. Jap. I. T. 33 (1900).

West Chemen, alt. 130 m.–160 m., *R. C. Ching*, nos. 3195 and 3180, August 9 and 8, 1925, (tree 8–15 m. tall, girth of trunk 0.75–1.3 m., bark gray, smooth); Kimen hsien, alt. 400 m., *K. Ling*, Herb. Univ. Nanking no. 7822, August 19, 1924, (tree 12 m. tall, girth of trunk 0.6 m., bark smooth, whitish).

ULMACEAE

Determined by A. Rehder

Ulmus parvifolia Jacquin, Pl. Rar. Hort. Schoenbr. III. 6, t. 262 (1798).—Shirasawa, Icon. Ess. For. Jap. I. 68, t. 37, fig. 1–9 (1900).—Schneider in Sargent, Pl. Wilson. III. 245 (1916).

South Siunin, alt. 300 m., *R. C. Ching*, no. 3315, September 6, 1925 (tree 15 m. tall).

Ulmus Davidiana Planchon in Compt. Rend. Acad. Sci. Paris, LXXIV. pt. I. 1498 (1872), nom. nudum; in De Candolle, Prodr. XVII. 158 (1873).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 76, t. 8, fig. (Pl. David. I. 266) (1884).

Chuchow, Herb. Univ. Nanking no. 196, June 25, 1920.

Hemiptelea Davidii Planchon in Compt. Rend. Acad. Paris, LXXIV. 132, 1496 (1872); in De Candolle, Prodr. XVII. 165 (1873).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 78, t. 9 (Pl. David. I. 268, t. 9) (1884).

Tai ping hsien, in thickets along banks of streams, alt. 1200 m., *R. C. Ching*, no. 2888, July 3, 1925 (spreading shrub).

Zelkova sinica Schneider in Sargent, Pl. Wilson. III. 286 (1916).

Zelkova acuminata Hemsley in Jour. Linn. Soc. XXVI. 499 (1894), pro parte.—Non Planchon.

Chuchow, Herb. Univ. Nanking no. 1025, June 25, 1920.

Pteroceltis Tatarinowii Maximowicz in Bull. Acad. Sci. St. Pétersb. XVIII. 293, fig. (1873); in Mél. Biol. IX. 27, t. (1873).—Chun, Chin. Econ. Trees, 115 fig. 43 (1923).

Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no. 2311, June 14, 1922; Li shan, Chemen, alt. 180 m., *R. C. Ching*, no. 3127, August 5, 1925 (tree 20 m.); Chuchow, *L F. Tsu*, Herb. Univ. Nanking no. 195, June 26, 1920.

Celtis sinensis Persoon, Syn. Pl. I. 292 (1805).—Nakai in Icon. Pl. Koisikav. I. 3, t. 2, fig. II (1911).—Schneider in Sargent, Pl. Wilson. III. 277 (1916).

Chu hwa shan, Hsia ken, *A. N. Steward*, no. 1112, Herb. Univ. Nanking no. 5241, April 22, 1924; Wang shan, alt. 250 m., *R. C. Ching*, no. 2929, July 5, 1925 (tree 20 m. tall); Li shan, Chemen, in open valley, alt. 200 m., *R. C. Ching*, no. 3117, August 5, 1925 (tree 15 m. tall).

Celtis Biondii Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 252, fig. 3 (1910).

Wu yuan, *K. Ling*, no. 1300, Herb. Univ. Nanking no. 7839, August 21, 1924; Liu yung chen, alt. 250 m., *R. C. Ching*, no. 2880, June 30, 1925 (tree 12 m. tall); Wang shan, open woods, alt. 550 m., *R. C. Ching*, no. 2909, July 5, 1925 (tree 12 m. tall); south Chemen, alt. 260 m., *R. C. Ching*, no. 3197, August 13, 1925 (tree 10 m. tall).

Celtis Julianae Schneider in Sargent, Pl. Wilson. III. 265 (1916).

Chemen, in open wood, alt. 250 m., *R. C. Ching*, no. 3139, August 5, 1925 (tree 16 m. tall).

A handsome and very distinct species with large pubescent and reticulate leaves and large brownish orange fruits on long stout stalks.

Trema cannabina Loureiro, Fl. Cochin. 562 (1790).

South Chemen, hillside, alt. 130 m., *R. C. Ching*, no. 3196, August 13, 1925 (bushy shrub, 5 m. tall).

Aphananthe aspera Planchon in De Candolle, Prodr. XVII. 208 (1873).—Shirasawa, Icon. Ess. For. Jap. I. 67, t. 37, fig. 10–20 (1900).

Kimen hsien, *N. K. Ip*, Herb. Univ. Nanking no. 4779, August 22, 1923 (tree 16 m. tall, diam. of trunk 25 cm.); Heh hsien, *K. Ling*, no. 1255, Herb. Univ. Nanking no. 7801, August 14, 1924 (tree 20 m. tall, diam. of trunk 40 cm.); Chu hwa shan, undergrowth, *R. C. Ching*, no. 2706, Herb. Univ. Nanking no.7633, May 2, 1925 (shrub 2 m. tall); Wang shan, open moist valley, alt. 400 m., *R. C. Ching*, no. 2925, July 5, 1925 (tree 20 m. tall).

MORACEAE

Determined by A. Rehder

Morus alba Linnaeus, Spec. 986 (1753).— Koidzumi in Bull. Imp. Seric. Exp. Sta. Japan. IX. 52, t. 10 (Rev. Gen. Morus) (1917).

Chu hwa shan, cultivated, *R. C. Ching*, no. 2676, Herb. Univ. Nanking no. 7604, May 2, 1925 (tree 8 m. tall).

Morus cathayana Hemsley in Jour. Linn. Soc. XXVI. 456 (1894).

Chu hwa shan, woods, *R. C. Ching*, nos. 2628 and 2698, Herb. Univ. Nanking nos. 7556 and 7626, April 29 and May 2, 1925 (tree 22–28 m. tall).

Morus acidosa Griffith, Not. Pl. As. IV. 388 (1855), "*acidosus*."—Schneider in Sargent, Pl. Wilson. III. 297 (1916).

Morus bombycis Koidzumi in Tokyo Bot. Mag. XXIX. 313 (1915); in Bull. Imp. Seric. Exp. Sta. Japan, IX. 32, t. 2, (Rev. Gen. Morus) (1917).

Tien tai, Chu hwa shan, in woods partially shaded, alt. 1220 m., *R. C. Ching*, no. 2792, June 28, 1925 (shrub, about 2 m. tall); Wang shan, undergrowth, alt. 1220 m., *R. C. Ching*, no. 2984, July 12, 1925 (slender shrub 6 m. tall).

The Chinese plant here referred to *M. acidosa* differs somewhat from the typical form from India also found in southern China and Formosa, chiefly in the larger and narrower more caudate-acuminate leaves; it agrees with *M. bombycis* Koidz. and might be distinguished as a variety from typical *M. acidosa*.

Broussonetia Kaempferi Siebold in Verh. Bot. Genoot. XII. 28 (Syn. Pl. Oecon. Jap.) (1830).—Blume, Mus. Bot. Lugd.-Bat. II. 87, t. 40 (1852).

Chu hwa shan, *A. N. Steward*, no. 1121, Herb. Univ. Nanking no. 5250, April 23, 1924; same locality, on rocky banks of streams, *R. C. Ching*, no. 2587, Herb. Univ. Nanking no. 7513, April 28, 1925 (shrub with long slender branches of climbing habit, 10 m. high); Tien-tsi, Chu hwa shan, open rocky banks of streams, alt. 650 m., *R. C. Ching*, no. 2794, June 28, 1925 (bush about 3 m. tall, with long slender branches).

Vanieria tricuspidata Hu in Jour. Arnold Arb. v. 228 (1924).

Cudrania tricuspidata Bureau in Lavallée, Arb. Segrez, 243 (1877).

Cudrania triloba Forbes in Jour. Bot. xxi. 145 (1883).—Oliver in Hooker's Icon. Pl. xviii. t. 1792 (1888).

Pu chu, *N. K. Ip*, Herb. Univ. Nanking no. 5134, August 24, 1923; Wang si chi, south Chu hwa shan, open thickets on hillside, alt. 600 m *R. C. Ching*, no. 2878, June 30, 1925 (shrub with long branches, 6 m. high); Ye hsien, open thickets, alt. 130 m., *R. C. Ching*, no. 3079, July 26, 1925 (small tree or shrub 10 m. tall).

Ficus erecta Thunb. var. **Beecheyana** King in Ann. Bot. Gard. Calcutta, i. pt. ii. 142, t. 178 A (1888).

Ficus Beecheyana Hooker & Arnott, Bot. Voy. Beechey, 271 (1841).

Wu yuan, side of stream, *K. Ling*, no. 1327, Herb. Univ. Nanking no. 7864, August 24, 1924 same locality, open thickets, *R. C. Ching*, nos. 3270 and 3271, August 21, 1925 (shrub 3 m. tall).

Though the extreme forms of *F. Beecheyana* look very distinct from the Japanese *F. erecta* Thunb. on account of their larger and broader, densely pubescent leaves the copious material before me from eastern China shows many intergrading forms, even the three specimens cited above all from the same locality differ from each other in pubescence and shape of leaves, Ling's specimen being quite pubescent with rather large and broad leaves, while Ching's no. 3270 has oblong-lanceolate leaves, pilose only on the midrib and very sparingly on the veins beneath and minutely short-pubescent branchlets and his no. 3270 is intermediate between the two.

Ficus pandurata Hance in Ann. Sci. Nat. ser. 4, xviii. 229 (1862).—King in Ann. Bot. Gard. Calcutta, i. pt. ii. 141, t. 177 B (1888).

Wang shan, Wu Yuan, *K. Ling*, no. 1299, Herb. Univ. Nanking no. 9624, August 21, 1924.

The leaves, though more or less obovate, are not or very slightly panduriform.

Ficus stenophylla Hemsley in Hooker's Icon. xxvi. t. 2536 (1897).

Wang shan, Tao chuang, *K. Ling*, no. 1306, Herb. Univ. Nanking no. 9625, August 22, 1924 (shrub 1 m. tall); Wu yuan, alt. 420 m., *N. K. Ip*, no. 73, Herb. Univ. Nanking no. 7689, August 22, 1924; Kimen, *K. Ling*, 1269, Herb. Univ. Nanking no. 7813, August 18, 1924; south of Chemen, alt. 130 m., *R. C. Ching*, no. 3203, August 13, 1925.

Ling's specimen from Kimen and Ching's specimen are doubtfully re-

ferred here; they have broader oblong-lanceolate or even obovate-lanceolate leaves, but otherwise do not seem to be much different.

Ficus foveolata Wallich, Cat. No. 4493 a-e (1830), nomen.—Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 294 (1867).—King in Ann. Bot. Gard. Calcutta, I. pt. II. 133, t. 167, 168 (1888).

Wang shan, near Mao pung, *A. N. Steward*, no. 1336, Herb. Univ. Nanking no. 7207, August 12, 1924 (shrub 1–2 m. tall).

The leaves of this specimen are rather thinly coriaceous and glabrate beneath and the fruits are 9–10 mm. across, subglobose and pubescent.

Ficus foveolata var. **Henryi** King apud Oliver in Hooker's Icon. XIX. t. 1824 (1889).

Chu hwa shan, *K. Ling*, no. 2028, Herb. Univ. Nanking no. 7293, April 23, 1924 (shrub 1 m. tall), *R. C. Ching*, no. 2674, Herb. Univ. Nanking no. 7602, May 2, 1925; Kimen, alt. 400 m., *N. K. Ip*, no. 46, Herb. Univ. Nanking no. 7670, August 19, 1924.

This variety differs chiefly in its sessile ovoid rather large fruit; the leaves of the specimen cited above are strongly coriaceous and pubescent beneath.

Ficus Baileyi Hutchinson in Bailey, Gent. Herb. I. 19, fig. 4, b, c (1920).

Chu hwa shan, Chi yuen sze, alt. 900 m., *A. N. Steward*, no. 1154, Herb. Univ. Nanking no. 5278, April 25, 1924; Ching yang hsien, *K. Ling*, no. 1126, Herb. Univ. Nanking no. 7716, August 6, 1924; Wang shan, on open rocky cliffs, *R. C. Ching*, no. 3024, July 15, 1925 (climber to 10 m. high); Wu yuan, in woods, alt. 160 m., *R. C. Ching*, no. 3288, August 29, 1925 (climber on Camphor trees, up to 26 m. high).

Ficus pumila Linnaeus, Spec. 1016 (1753).—King in Ann. Bot. Gard. Calcutta, I, pt. II. 124, t. 158 (1888).

Chu hwa shan, Hsia ken, alt. 300 m., *A. N. Steward*, no. 1111, Herb. Univ. Nanking no. 5240, April 22, 1924; I hsien, *K. Ling*, no. 1263, Herb. Univ. Nanking no. 7807, July 15, 1924; Wu yuan an, on open walls or trees, *R. C. Ching*, no. 3276, August 22, 1925 (strong climber, up to 16 m. high).

URTICACEAE

Determined by A. REHDER

Boehmeria nivea Gaudichaud in Freycinet, Voy. Bot. 499 (1826).—Hooker's Jour. Bot. & Kew Gard. Misc. III. 315, t. 8 (1851).

Wang shan, alt. 1200 m., *A. N. Steward*, no. 1331, Herb. Univ. Nanking no. 7202, August 12, 1924; west Chemen, on open rocky banks, alt. 220 m., *R. C. Ching*, no. 3184, August 8, 1925 (shrub 1.75 m. tall).

Villebrunea frutescens Blume, Mus. Bot. Lugd.-Bat. II. 168 (1856).—Weddell in De Candolle, Prodr. XVI. pt. I. 23521 (1869).

Li shan, in shaded ravine, alt. 220 m., *R. C. Ching*, no. 3132, August 5, 1925 (dense shrub, 3 m. tall).

LORANTHACEAE

Determined by A. REHDER

Loranthus caloreas Diels var. **oblongifolius** Lecomte in Not. Syst. III. 49 (1916).

Wang shan, alt. 1200 m., *K. Ling*, no. 1220, Herb. Univ. Nanking no. 7780, August 12, 1924 (epiphytic on *Tsuga chinensis*); south side of Wang shan, alt. 800 m., *R. C. Ching*, no. 3060, July 20, 1925 (epiphytic shrub 1.5 m. tall, on branches of Pseudotsuga, fide Ching).

Loranthus yadoriki Siebold apud Maximowicz in Bull. Acad. Sci. St. Pétersb. XXII. 229 (1876); in Mél. Biol. IX. 609 (1877).

Loranthus Jodoniki Siebold apud Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 193 (Fl. Jap. Fam. Nat. I. 85) (1845), nom. nudum.

West of Kweichou City, alt. 130 m., *R. C. Ching*, no. 3342, September 10, 1925 (epiphytic shrub, 2 m. tall, on Oak tree; sterile).

SANTALACEAE

Determined by A. REHDER

Buckleya lanceolata Miquel, Cat. Mus. Bot. Lugd.-Bat. Fl. Jap. 79 (1870).

Ye hsien, margin of wood, alt. 300 m., *R. C. Ching*, no. 3087, July 27, 1925 (slender shrub 4 m. tall).

OLACACEAE

Determined by A. REHDER

Schoepfia jasminodora Siebold & Zuccarini in Abh. Akad. Munch. IV. pt. III. 135 (Fl. Jap. Fam. Nat. II. 11) (1846).

Wang shan, open wood, alt. 550 m., *R. C. Ching*, no. 2915, July 5, 1925 (small tree 12 m. tall).

CERCIDIPHYLLACEAE

Determined by A. REHDER

Cercidiphyllum japonicum var. **sinense** Rehder & Wilson in Sargent, Pl. Wilson. I. 316 (1913).

Cercidiphyllum japonicum Chun, Chin. Econ. Trees, 134, t. 51 (1923).—Non Siebold & Zuccarini.

Chang gon shan, Wu yuan, wooded ravine, *R. C. Ching*, no. 3244, August 17, 1925 (tree 14 m. tall).

RANUNCULACEAE

Determined by A. REHDER

Clematis heracleifolia DC. var. **ichangensis** Rehder & Wilson in Sargent, Pl. Wilson. I. 321 (1913).

Wang shan, on grassy foot-hill, alt. 1200 m., *R. C. Ching*, no. 3032, July 15, 1925 (low shrub 0.5 m. tall).

Clematis florida Thunberg, Fl. Jap. 240 (1784).—A. Henry in Gard. Chron. ser. 3, XXXII. 51, fig. 20 (1902).

South of Tatung, along path near cultivated field, *R. C. Ching*, no. 2707, May 3, 1925; without locality, *R. C. Ching*, no. 2731, in 1925.

Clematis montana Buchanan-Hamilton apud De Candolle, Syst. I. 164 (1818).—Wallich, Pl. As. Rar. III. t. 217 (1832).—Lindley in Bot. Reg. XXVI. t. 53 (1840).

Tien tai, Chu hwa shan, open thickets, *R. C. Ching*, no. 2787, June 28, 1925 (climber to 7 m. high); Wang shan, in woods, alt. 1350 m., *R. C. Ching*, no. 3045, July 17, 1925 (climber up to 10 m. tall).

Clematis uncinata Champion in Hooker's Jour. Bot. & Kew Gard. Misc. III. 255 (1851).

Clematis leiocarpa Oliver in Hooker's Icon. XVI. t. 1533 (1886).

Wang shan, in open thickets, alt. 550 m., *R. C. Ching*, no. 2938, July 11, 1925 (climber to 12 m. high); Ye hsien, open thickets, alt. 400 m., *R. C. Ching*, no. 3072, July 21, 1925.

Clematis Pavoliniana Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 270 (1910).—Sprague in Bot. Mag. CXLII. t. 8655 (1916).

Chu hwa shan, thickets, *R. C. Ching*, no. 2704, May 2, 1925 (evergreen climber to 13 m. high).

Clematis chinensis Retzius, Observ. II. 18, no. 53, t. 2 (1781).

West gate of Kweichou city, partially shaded thickets, alt. 100 m., *R. C. Ching*, no. 3340, September 10, 1925 (dense climber to 10 m. high).

Clematis grata Wall. var. **grandidentata** Rehder & Wilson, in Sargent, Pl. Wilson. I. 338 (1913).

Chu hwa shan, open thickets, *R. C. Ching*, no. 2774, June 27, 1925; without locality, *R. C. Ching*, no. 4017, in 1925.

Clematis brevicaudata DC. var. **lissocarpa** Rehder & Wilson in Sargent, Pl. Wilson. I. 340 (1913).

South side of Wang shan, woods, alt. 1200 m., *R. C. Ching*, no. 3070, July 20, 1925 (climbing on trees, 10 m. high); Li shan, northwest Chemen, woods, alt. 200 m., *R. C. Ching*, no. 3148, August 6, 1925 (slender climber); Chang gon shan, Wu yuan, alt. 900 m., *R. C. Ching*, no. 3233, August 17, 1925 (climber, 10 m. high).

Clematis Henryi Oliver in Hooker's Icon. XIX. t. 1819 (1889).

Chu hwa shan, undergrowth, *R. C. Ching*, no. 2658, May 1, 1925 (climber, every joint producing roots).

LARDIZABALACEAE

Determined by A. REHDER

Decaisnea Fargesii Franchet in Jour. de Bot. VI. 234 (1892).—Hooker f. in Bot. Mag. CXXVIII. t. 7848 (1902).

Wang shan, wooded ravine, alt. 1000 m., *R. C. Ching*, no. 2948, July 12, 1925 (many-stemmed shrub to 6 m. tall).

Holboellia coriacea Diels in Bot. Jahrb. XXIX. 342 (1900).

Chu hwa shan, shrubby roadside, *R. C. Ching*, no. 2611, Herb. Univ. Nanking no. 7536, April 29, 1925 (evergreen climber to 10 m. high); Wang shan, alt. 1000 m., *R. C. Ching*, no. 2953, July 12, 1925 (climber 10 m. high).

Akebia trifoliata Koidzumi in Tokyo Bot. Mag. XXXIX. 310 (1925).

Clematis trifoliata Thunberg in Trans. Linn. Soc. II. 337 (1794).

Akebia lobata Decaisne in Arch. Mus. Paris, I. 196, t. 13 b (1839).—Hooker f. in Bot. Mag. CXXII. t. 7485 (1896).

Chu hwa shan, woods or exposed places, *R. C. Ching*, no. 2585, Herb. Univ. Nanking no. 7511, April 28, 1925 (climbing on trees, 10 m. high); Li shan, northwest Chemen, open woods, alt. 300 m., *R. C. Ching*, no. 3143, August 6, 1925 (climbing on trees, 10 m. high).

Akebia quinata Decaisne in Arch. Mus. Paris, I. 195 t. 13 a (1839).—Hooker in Bot. Mag. LXXXI. t. 4864 (1855).

Wang shan, T'ang kou to Kang chuen, alt. 800 m., *N. K. Ip*, no. 23, Herb. Univ. Nanking no. 7652, August 14, 1924; Ye hsien, woods or open thickets, alt. 350 m., *R. C. Ching*, no. 3075, July 21, 1925 (climber, 15 m. high).

SARGENTODOXACEAE

Determined by A. REHDER

Sargentodoxa cuneata Rehder & Wilson in Sargent, Pl. Wilson. I. 351 (1913).—Stapf in Bot. Mag. CLI. t. 9111, 9112 (1926).

Wang shan, alt. 1000 m., *A. N. Steward*, no. 1261, Herb. Univ. Nanking no. 5500, August 9, 1924; same locality, alt. 700 m., *R. C. Ching*, no. 2969, July 12, 1925 (twining climber 20 m. high).

BERBERIDACEAE

Determined by A. REHDER

Nandina domestica Thunberg, Fl. Jap. 9 (1784).—Sims in Bot. Mag. XXVIII. t. 1109 (1808).

Wang shan, undergrowth in ravines, alt. 550 m., *R. C. Ching*, no. 2900, July 5, 1925 (shrub, 1.2 m. tall), *Y. M. Kwoh*, no. 4, Herb. Univ. Nanking no. 12085, Nov. 27, 1925.

Berberis Henryana Schneider in Bull. Herb. Boissier, sér. 2, v. 664 (1905); in Sargent, Pl. Wilson. III. 440 (1917).

Wang shan, alt. 1850 m., *K. Ling*, nos. 1177, 1192, Herb. Univ. Nanking nos. 7750 and 7756, August 11, 1924; Wang shan, below Sz tz ling, alt. 1700 m., *A. N. Steward*, no. 1313, Herb. Univ. Nanking no. 7184, August 12, 1924; same locality, back of Lion Ridge, in dense woods near ridge, alt. 1300 m., *R. C. Ching*, no. 2981, July 12, 1925 (spreading shrub, 6 m. tall).

The specimens cited above differ from the type in the gray or yellowish often somewhat grooved branches.

Berberis sp.

Chang gon shan, Wu yuan, thickets in ravine, *R. C. Ching*, no. 3248, August 17, 1925 (shrub, 1 m. tall).

This belongs to the Wallichianae group, but it does not agree with any of the species of this group known to me. The leaves are elliptic-lanceolate to oblanceolate, up to 4.5 cm. long, with only 1–4 small nearly upright teeth on each side, thinly coriaceous with the lateral veins visible beneath, covered when young with glaucous bloom which later partly disappears; young fruits ellipsoid, bloomy, on pedicels about 1 cm. long in many-flowered fascicles.

It is probably a new species, but as neither mature fruits nor flowers are available, I hesitate to describe it.

Mahonia Bealii Carrière in Fl. des Serr. x. 166 (1754–55).—Takeda in Not. Bot. Gard. Edinb. VI. 225, t. 12, 13, 34, fig. 83–103 (1917).

Huang lien, Tai ping hsien, *A. J. Bowen*, no. 2, Herb. Univ. Nanking no. 12083, November 28, 1925.

MENISPERMACEAE

Determined by A. REHDER

Cocculus trilobus De Candolle, Syst. I. 522 (1818).—Diels in Engler, Pflanzenr. IV–94, 232, fig. 78 a–l (1910).

Cocculus Thunbergii De Candolle, Syst. I. 524 (1818).

Tze kuan sze, Wang shan, alt. 1100 m., *A. N. Steward*, no. 1275, Herb. Univ. Nanking no. 7147, August 11, 1924; Liu chu wan, on the way to Chu wang shan, alt. 250 m., along moist roadside, *R. C. Ching*, no. 2738, June 25, 1925 (trailing or climbing to 1.75 m. high).

Sinomenium acutum Rehder & Wilson in Sargent, Pl. Wilson. I. 387 (1913).

Sinomenium diversifolium Diels in Engler, Pflanzenr. IV–94, 254 (1910).—Hemsley in Gard. Chron. ser. 3, LII. 402, fig. 178 (1912).

Wangsi che, south Chu hwa shan, alt. 600 m., open thickets, *R. C. Ching*, no. 2842, June 29, 1925 (twining climber, 10 m. high).

Menispermum dauricum De Candolle, Syst. I. 540 (1818).—Sargent in Gard. & Forest, v. 234, fig. 42 (1892).

North foot of Chu hwa shan, alt. 300 m., moist bushy hillside, *R. C. Ching*, no. 2760, June 25, 1925 (twining climber, to 13 m. high).

MAGNOLIACEAE

Determined by E. H. Wilson

Magnolia denudata Desrousseaux in Lamarck, Encycl. Méth. Bot. III. 675 (1791).—Rehder & Wilson in Sargent, Pl. Wilson. I. 399 (1913), where full citations of literature and synonymy are given.

Magnolia conspicua Salisbury, Parad. Lond. I. t. 38 (1806).
Magnolia Yulan Desfontaines, Hist. Arb. III. 6 (1809).

Chu hwa shan, woods, *R. C. Ching*, no. 2617, Herb. Univ. Nanking no. 7542, April 29, 1925, (tree 20 m. tall, girth of trunk 1.5 m. bark brownish gray, flowers white, tinged purplish at base, fragrant; very common); same locality, alt. 600 m., *R. C. Ching*, no. 2865, June 30, 1925, (tree 20 m. tall, girth of trunk 2.6 m.).

Magnolia cylindrica Wilson, spec. nov.

Arbor vel frutex, 6–10 m. altus; ramuli graciles, juveniles sericei, maturi laeves, intense purpureo-brunnei; gemmae parvae, ovoideae, acutae, pilis cinereis lanuginosis vel flavo-cinereis villosis vestitae. Folia membranacea, decidua, longe petiolata petiolo gracili sericeo 8–20 mm. longo, oblanceolato-oblonga vel oblongo-lanceolata, rarius oblongo-obovata, 6–14 cm. (pleraque 8–10 cm.) longa et 2–5 cm. (pleraque 3–4 cm.) lata, obtusa vel subacuta, basi cuneata, rarius rotundata, intense viridia, supra glabra et reticulata, subtus pallidiora et glabrescentia. Flores non visi. Fructus cylindricus, 5–7.5 cm. longus et 2–2.5 cm. diam.; carpella numerosa, lignea, laevia, leviter verruculosa, pleraque disperma seminibus parvis; pedunculus dense cinereo-villosus, 0.5–1 cm. longus.

Wang shan, alt. 1150 m., shady ravine, *R. C. Ching*, no. 2949, type, July 12, 1925; same locality, alt. 1,400 m., *R. C. Ching*, no. 2994, July 13, 1925; same locality, alt. 1,350 m., *K. Ling*, no. 1150, Herb. Univ. Nanking no. 7730, August 9, 1924.

This very distinct new species is well distinguished by its thin, narrow, prominently reticulated leaves, by its slender petioles, and by its cylindric fruits. It is most closely related to the Japanese *M. salicifolia* Maxim. which has rather larger leaves usually acuminate and glaucescent on the under side, glabrous winter buds and branchlets, and a smaller, much less cylindric fruit. The flowers of our new species are unknown but they appear before the leaves. The foliage is deciduous and the wood when cut has a spicy fragrance similar to that of *M. salicifolia* Maxim. and *M. kobus* DC.

Magnolia parviflora Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 187 (Fl. Jap. Fam. Nat. I. 79) (1843).—Hooker f. in Bot. Mag. CXXI. t. 7411 (1895).—Rehder & Wilson in Sargent, Pl. Wilson. I. 406 (1913).

Wang shan, back of Lion Ridge, alt. 1400 m., *R. C. Ching*, nos. 2975, 2979 and 3035, July 12 and 15, 1925 (shrub 8–9 m. tall; common, in partially shaded ravines).

Heretofore known only from Japan and Korea this species of Magnolia is an interesting addition to the Chinese flora. The material is ample, consisting of good leaf specimens bearing flowers and unripe fruit. The leaves are less prominently villose on the under surface and their texture is thinner than is usual in Japanese and Korean specimens but I can find no other difference. This extention of range is unusual in this genus.

Magnolia officinalis var. **biloba** Rehder & Wilson in Sargent, Pl. Wilson. I. 392 (1913).

Wang shan, Mao pung, alt. 1100 m., in Bamboo forest, *K. Ling*, no. 1165, Herb. Univ. Nanking no. 7740, August 9, 1924, (tree 6 m. tall, girth of trunk 0.3 m., bark smooth).

The bilobed character of the leaves in this Magnolia is both constant and remarkable.

Michelia figo Sprengel, Syst. II. 643, (1825).
Liriodendron figo Loureiro, Fl. Cochinch. 347 (1790).
Magnolia fuscata Andrews, Bot. Repos. IV. t. 229 (1802).
Michelia fuscata Blume, Fl. Jav. Magnol. 8 (1828).

Wu yuan, *K. Ling*, no. 1345, Herb. Univ. Nanking no. 7878, August 25, 1924, (bush 8 m. tall, flowers aromatic).

Kadsura peltigera Rehder & Wilson in Sargent, Pl. Wilson. I. 410 (1913).

Li kan, west Chemen, alt. 100 m., *R. C. Ching*, no. 3159, April 7, 1925, (climber 10 m. tall, flowers greenish yellow, common); Wu yuan, border of stream, *K. Ling*, no. 1328, Herb. Univ. Nanking no. 7865, August 24, 1924 (climber 8 m. tall, flowers yellowish); Ching yang hsien, *K. Ling*, no. 1125, Herb. Univ. Nanking no. 7715, August 6, 1924 (climber, flowers light yellow); Kimen, *N. K. Ip*, no. 40, Herb. Univ. Nanking no. 7665 August 19, 1924 (climber, flowers yellow, fragrant).

Schisandra sphenanthera Rehder & Wilson in Sargent, Pl. Wilson. I. 414 (1913).

Li kan, west Chemen, alt. 230 m., *R. C. Ching*, no. 3166, August 7, 1925 (climber 13 m. tall, fruit greenish, turning bright red; common), Chu hwa shan, *R. C. Ching*, no. 2591, April 28, 1925; Wang shan, alt. 1500 m., *R. C. Ching*, no. 3008, July 15, 1925 (a trailing vine, 5 m. long, flowers dark purple).

Illicium Henryi Diels in Bot. Jahrb. XXIX. 323 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. I. 417 (1913).

Without precise locality, *R. C. Ching*, no. 2519, in 1925.

CALYCANTHACEAE

Determined by A. REHDER

Meratia praecox Rehder & Wilson in Sargent, Pl. Wilson. I. 419 (1913).
Calycanthus praecox Linnaeus, Spec. ed. 2, 718 (1762).—Curtis in Bot. Mag. XIII. t. 466 (1799).
Chimonanthus fragrans Lindley in Bot. Reg. VI. t. 451 (1820).

Heh hsien, *K. Ling*, no. 1260, Herb. Univ. Nanking no. 7804, August 15, 1924; Ye hsien, woods, in partial shade, alt. 300 m., *R. C. Ching*, no. 3088, July 27, 1925 (shrub 5 m. tall); Su hsien, alt. 500 m., *R. C. Ching*, no. 3092, July 27, 1925 (shrub 6.5 m. tall).

LAURACEAE

Determined by A. REHDER

Cinnamomum Camphora Fr. Nees von Esenbeck & Ebermaier, Handb. Med. Pharm. Bot. II. 430 (1831).

Camphora officinarum C. G. Nees von Esenbeck in Wallich, Pl. As. Rar. II. 72 (1831).

Li kau, west Chemen, alt. 100 m., *R. C. Ching*, no. 3149, August 7, 1925 (tree 15 m. tall).

Cinnamomum spec.

Wang shan, Yuen ku sze, alt. 1200 m., *K. Ling*, no. 1222, Herb. Univ. Nanking no. 7782, August 12, 1924 (tree 5 m. tall); Chemen, alt. 100 m., *R. C. Ching*, no. 3169, August 8, 1925 (tree 8 m. tall).

The specimens resemble *C. argenteum* Gamble, but the young branchlets, petioles and the inflorescence are covered with a fine silky pubescence.

Phoebe Sheareri Gamble in Sargent, Pl. Wilson, II. 72 (1914).

Machilus Sheareri Hemsley in Jour. Linn. Soc. XXVI. 377 (1891).

Li shan, northwest Chemen, alt. 230 m., *R. C. Ching*, no. 3147, August 6, 1925 (tree 9 m.).

Machilus Thunbergii Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 202 (Fl. Jap. Fam. Nat. II. 78) (1846).

Kimen, *N. K. Ip*, no. 43, Herb. Univ. Nanking no. 7668, and K. Ling, no. 1281, Herb. Univ. Nanking no. 7823, August 19, 1924.

Machilus ichangensis Rehder & Wilson in Sargent, Pl. Wilson. II. 621 (1916).

Machilus Thunbergii Hemsley in Jour. Linn. Soc. XXIII. 378 (1891), pro parte; Hooker's Icon. XXVI. t. 2538 (1897).—Non Siebold & Zuccarini.

Kimen hsien, *K. Ling*, no. 1278, Herb. Univ. Nanking no. 7820, August 19, 1924, (tree 10 m. tall); Chemen, alt. 260 m., *R. C. Ching*, no. 3176, August 8, 1925 (tree 13 m. tall).

Ching's no. 3176 has unusually large leaves up to 27 cm. long.

Sassafras tzumu Hemsley in Kew Bull. Misc. Inform. 1907, 55; in Hooker's Icon. XXIX. t. 2833 (1907).

Pseudosassafras Tzumu Lecomte, Not. Syst. II. 269 (1912).

Chu hwa shan, *R. C. Ching*, no. 2597, Herb. Univ. Nanking no. 7522, April 28, 1925 (tree 17 m. tall); Tai ping hsien, alt. 200 m., *R. C. Ching*, no. 2886, July 3, 1925 (tree 17 m. tall).

Litsea elongata Hooker f., Fl. Brit. Ind. v. 165 (1886).

Daphnidium elongatum C. G. Ness von Esenbeck in Wallich, Pl. As. Rar. II. 63 (1831).

Wang shan, *K. Ling*, no. 1233, Herb. Univ. Nanking, no. 7787, August 12, 1924; same locality, alt. 600–800 m., *R. C. Ching*, nos. 2935 and 2966, July 11 and 12, 1925; Chang gon shan, west Wu yuan, *R. C. Ching*, no. 3217, August 16, 1925.

Litsea glauca Siebold in Verh. Batav. Genootsch. XII. 24 (Syn. Pl. Oecon.) (1830); Meisner in De Candolle, Prodr. XV. pt. I. 224 (1864).

Wang shan, alt. 1550 m., *A. N. Steward*, no. 1295, Herb. Univ. Nanking no. 7166, August 11, 1924.

Litsea chinensis Blume, Bijdr. 565 (1825).

Actinodaphne chinensis Nees von Esenbeck, Syst. Laur. 600 (1836).

Pu chu, alt. 300 m., *N. K. Ip*, Herb. Univ. Nanking no. 4778, August 18, 1923 (tree 20 m. tall); Wu yuan, *K. Ling*, nos. 1321 and 1346, Herb. Univ. Nanking nos. 7859 and 7879, August 24, 25, 1924; Chu hwa shan, *R. C. Ching*, no. 2633, Herb. Univ. Nanking no. 7561, April 30, 1925; Wang shan, alt. 1500 m., *N. K. Ip*, Herb. Univ. Nanking no. 7288, August 28, 1923, *K. Ling*, no. 1160 and 1196, Herb. Univ. Nanking nos. 7735 and 7760, August 9 and 11, 1924; same locality, alt. 530 m., *R. C. Ching*, no. 2922, July 5, 1925; Wang si chu, Chu hwa shan, *R. C. Ching*, no. 2843, June 29, 1925; north Li kan, Chemen, alt. 100 m., *R. C. Ching*, no. 3154, August 7, 1925 (tree 16 m. tall); south Chemen, alt. 300 m., *R. C. Ching*, no. 3205, August 13, 1925 (tree 28 m. tall).

Litsea cubeba Persoon, Syn. II. 4 (1807).

Litsea citrata Blume, Bijdr. 565 (1825).

Wang shan, *N. K. Ip*, Herb. Univ. Nanking no. 4770, August 28, 1923, *K. Ling*, no. 1174, Herb. Univ. Nanking no. 7747, August 11, 1924; same locality, alt. 600 m., *R. C. Ching*, no. 2942, July 12, 1925 (shrub 5 m. tall); Tien tai shan, Chu hwa shan, *A. N. Steward*, no. 1170, Herb. Univ. Nanking no. 5292, April 25, 1924; same locality, alt. 1150 m., *R. C. Ching*, no. 2823, June 28, 1925 (shrub 6 m. tall); west Chemen, alt. 2600 m., *R. C. Ching*, no. 3171, August 8, 1925.

Benzoin praecox Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 205 (Fl. Jap. Fam. Nat. II. 81) (1846).

Lindera praecox Blume, Mus. Bot. Lugd.-Bat. I. 324 (1850).—Shirasawa Icon. Ess. For. Jap. II. t. 19, fig. 1–10 (1900).

Without precise locality, *R. C. Ching*, no. 5081, in 1925.

This Japanese species has not been recorded before from China where it seems rare, since the specimen cited above is the only one seen.

Benzoin glaucum Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 205 (Fl. Jap. Fam. Nat. II. 81) (1846).

Lindera glauca Blume, Mus. Bat. Lugd.-Bat. I. 325 (1850).

Chuchow, *L. F. Tsu*, Herb. Univ. Nanking no. 1676, June 25, 1920; Wang shan, alt. 1000 m., *N. K. Ip*, Herb. Univ. Nanking no. 4766, August 28, 1923; 60 li north of Chu hwa shan, *R. C. Ching*, no. 2711, Herb. Univ. Nanking no. 7625, May 2, 1925 (shrub 6 m. tall); Wang si

che, south Chu hwa shan, alt. 550 m., *R. C. Ching*, no. 2871, June 30, 1925 (shrub 6.5 m. tall).

Benzoin grandifolium Rehder in Jour. Arnold Arb. I. 145 (1919).
Lindera megaphylla Hemsley in Jour. Linn. Soc. XXVI. 388 (1891).
Chemen, alt. 230, m., *R. C. Ching*, no. 3129, August 5, 1925.

Benzoin reflexum Rehder in Jour. Arnold Arb. I. 145 (1919).
Lindera reflexa Hemsley in Jour. Linn. Soc. XXVI. 391 (1891).
Wang shan, slope, *N. K. Ip*, Herb. Univ. Nanking no. 4785, August 28, 1923; same locality, alt. 1350 m., *K. Ling*, no. 1151, Herb. Univ. Nanking no. 7731, August 9, 1924; same locality, foot of mountain, *K. Ling*, no. 1199, Herb. Univ. Nanking no. 7762, August 11, 1924; Chu hwa shan, *R. C. Ching*, no. 2627, April 29, 1925; on the way to Chu hwa shan, *R. C. Ching*, no. 2746, June 25, 1925 (shrub 3 m. tall, fruit bright red); Tien tai, Chu hwa shan, alt. 1150 m., *R. C. Ching*, no. 2820, June 28, 1925; Li shan, northwest Chemen, alt. 550 m., *R. C. Ching*, no. 3119, August 5, 1925 (shrub 3 m. tall, fruit bright red).

Benzoin rubronervium Rehder in Jour. Arnold Arb. I. 145 (1919).
Lindera rubronervia Gamble in Sargent, Pl. Wilson. II. 84 (1914).
Wang si che, south Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2873, June 30, 1925.

Benzoin cercidifolium Rehder in Jour. Arnold Arb. I. 144 (1919).
Lindera cercidifolia Hemsley in Jour. Linn. Soc. XXVI. 387 (1891).
Wang shan, alt. 1350 m., *K. Ling*, no. 1200, Herb. Univ. Nanking, no. 7763, August 11, 1924 (shrub 3 m. tall); Tien tai, Chu hwa shan, alt. 1200 m., *R. C. Ching*, no. 2821, June 28, 1925 (shrub 8 m. tall); Chang gon shan, Wu yuan, alt. 1150 m., *R. C. Ching*, no. 3236, August 17, 1925 (shrub 12 m. tall; fruit shining black).

Benzoin strychnifolium Kuntze, Rev. Gen. II. 569 (1891).
Lindera strychnifolia Fernandez-Villar in Blanco, Fl. Filip. ed. 3, Nov. App. 182 (1880).
Kimen, alt. 450 m., *N. K. Ip*, no. 45, Herb. Univ. Nanking no. 7669, August 19, 1924; Chu hwa shan, *A. N. Steward*, no. 1184, Herb. Univ. Nanking no. 5301, April 25, 1924, *R. C. Ching*, no. 2609, Herb. Univ. Nanking no. 7534, April 28, 1925 (shrub 5 m. tall), no. 2768, June 26, 1925 (shrub 5 m. tall).

SAXIFRAGACEAE

Determined by A. REHDER

Philadelphus pekinensis Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 365 (1857); in Mél. Biol. II. 543 (1858).
Philadelphus coronarius ζ *pekinensis* Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, X, no. XVI. 42 (1867).
Wang shan, alt. 280 and 1350 m., *R. C. Ching*, nos. 2923 and 3005, July 5 and 15, 1925.

Philadelphus sericanthus Koehne var. **Rehderianus** Koehne in Fedde, Rep. Nov. Spec. x. 127 (1911).

Heh hsien, *K. Ling*, no. 1259, Herb. Univ. Nanking no. 7803, August 14, 1924.

Deutzia ningpoensis Rehder in Sargent, Pl. Wilson. I. 17 (1911).

Tien tai, Chu hwa shan, alt. 900 m., *R. C. Ching*, no. 2793, June 28, 1925; Wang shan, alt. 1200 m., *R. C. Ching*, no. 2983, July 12, 1925 (shrub 6 m. tall).

Deutzia spec.

Chu hwa shan, alt. 600 m., *R. C. Ching*, nos. 2657 (Herb. Univ. Nanking no. 7585), 2784, 2834 and 3001, May 1, June 27 and 28 and July 13, 1925.

The specimens cited above seem to be closely related to *D. paniculata* Nakai, according to the description, but as flowers are lacking the specimen having partly very young flower buds and partly fruit, I hesitate to identify it with that Korean species of which I have seen no specimens.

Hydrangea umbellata Rehder in Sargent, Pl. Wilson. I. 25 (1911).

Wang shan, *K. Ling*, no. 1188, Herb. Univ. Nanking no. 7753, August 11, 1924; same locality, alt. 600 and 1200 m., *R. C. Ching*, nos. 2944 and 2954, July 12, 1925 (shrub 1.5 m. tall); Tien tai, Chu hwa shan, alt. 1200 and 900 m., *R. C. Ching*, nos. 2786 and 2829B, June 28, 1925 (shrub 3–4 m. tall).

Ching's no. 2954 differs in its deeply dentate sepals and smaller and comparatively broader leaves.

Hydrangea paniculata Siebold in Nov. Act. Leop.-Carol. XIV. pt. II. 690 (Syn. Hydrang.) (1829).—Siebold & Zuccarini, Fl. Jap. I. 115, t. 61 (1840).

Wu yuan, alt. 800 m., *N. K. Ip*, no. 52, Herb. Univ. Nanking no. 7675, August 19, 1924; Kimen, *K. Ling*, no. 1274, Herb. Univ. Nanking no. 7816, August 18, 1924; Wang shan, *K. Ling*, no. 1208, Herb. Univ. Nanking no. 7769, August 12, 1924; Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2808, June 28, 1925.

Hydrangea strigosa Rehder in Sargent, Pl. Wilson. I. 31 (1911).

Wang shan, alt. 250 m., *A. N. Steward*, no. 1344, Herb. Univ. Nanking no. 7215, August 14, 1924.

Hydrangea strigosa var. **macrophylla** Rehder in Sargent, Pl. Wilson. I. 32 (1911).

Hydrangea aspera var. *macrophylla* Hemsley in Jour. Linn. Soc. XXIII. 273 (1887).

Shi teh hsien, at foot of mountain, *K. Ling*, no. 1132, Herb. Univ. Nanking no. 7721, August 7, 1924; Chemen, alt. 230 m., *R. C. Ching*, no. 3130, August 5, 1925.

Schizophragma integrifolium Oliv. var. **denticulatum** Rehder in Sargent, Pl. Wilson. I. 42 (1911).

Chu hwa shan, rocky cliff, *R. C. Ching*, no. 2685, May 2, 1925 (climber 20 m. high); Wang si che, south Chu hwa shan, rocky cliffs, alt. 600 m., *R. C. Ching*, no. 2850, June 29, 1925 (climber 18 m. high); Wang shan, in woods, alt. 950 m., *R. C. Ching*, no. 3002, July 13, 1925 (climber 14 m.).

Pileostegia viburnoides Hooker & Thomson in Jour. Linn. Soc. II. 76, t. 2 (1858).

South Siunin, alt. 130 m., *R. C. Ching*, no. 3322, September 7, 1925 (climber 14 m. high).

Itea chinensis Hooker & Arnott, Bot. Voy. Beechey, 188, t. 39 (1841).

Tsin yung, alt. 200 m., *R. C. Ching*, no. 2894, July 3, 1925 (slender shrub 6 m. tall); south Siunin, alt. 300 m., *R. C. Ching*, no 3325, September 7, 1925 (shrub 6 m. tall).

Ribes tenue Janczewski in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1906, p. 290 (Spec. Gen. Ribes, III. 11); in Mém. Soc. Phys. Hist. Nat. Genève XXXV. 463 (Monog. Groseill.) (1907).

Tien tai shan, Chu hwa shan, alt. 1500 m., *A. N. Steward*, no. 1163, Herb. Univ. Nanking no. 5286, April 25, 1924.

Ribes tenue typically has red-brown flowers but the flowers (staminate) of Steward' specimen are greenish according to the collector.

PITTOSPORACEAE

Determined by E. H. Wilson

Pittosporum glabratum Lindley in Jour. Hort. Soc. London, I. 230 (1846).—Hemsley in Jour. Linn. Soc. XXIII. 58 (1886).

Pittosporum Fortunei Turczaninow in Bull. Soc. Nat. Moscou, XXXVI, pt. I. 562 (1863).

Wang shan, alt. 600 m., ravines, *R. C. Ching*, no. 2904, July 5, 1925 (bush 1.5 m. high); same locality, *N. K. Ip*, Herb. Univ. Nanking nos. 7656 and 5137, August 14 and 28, 1923; *A. N. Steward*, no. 1252, Herb. Univ. Nanking no. 5491, August 9, 1924; west Chemen, alt. 160 m., *R. C. Ching*, no. 3183, August 8, 1925 (bush 1.5 m. high); Chu hwa shan, *R. C. Ching*, no. 2695, Herb. Univ. Nanking no. 7623, May 2, 1925.

HAMAMELIDACEAE

Determined by E. H. Wilson

Liquidambar formosana Hance in Ann. Sci. Nat. ser. 5, v. 215 (1866); Oliver in Hooker's Icon. XI. 14, t. 1020 (1867–1871).—Rehder & Wilson in Sargent, Pl. Wilson, I. 421 (1913).

Liquidambar acerifolia Maximowicz in Bull. Acad. Sci. St. Petersbourg, x. 486 (1866).

Liquidambar Maximowiczii Miquel in Ann. Mus. Lugd.-Bat. III. 200 (1877).

Chu hwa shan, woods, *R. C. Ching*, no. 2581, Herb. Univ. Nanking no. 7507, May 1, 1925 (tree 30 m. tall, girth of trunk 0.75 m.); Wang

shan, *K. Ling*, no. 1167, Herb. Univ. Nanking no. 7742, August 9, 1924 (tree 20 m. tall, girth of trunk 1.5 m.); Wu yuan, side of stream, *K. Ling*, no. 1317, Herb. Univ. Nanking no. 7855, August 24, 1924 (tree 20 m. tall, girth of trunk 1.8 m.); Kien ping, without collector's name, Herb. Univ. Nanking no. 1597, Sept. 3.

Distylium myricoides, Hemsley in Hooker's Icon. XXIX. sub t. 2835 (1907).

Wang shan, open thickets, alt. 800 m., *R. C. Ching*, no. 3026, July 15, 1925 (shrub 10 m. high; common).

Sycopsis sinensis Oliver in Hooker's Icon. XX. t. 1931 (1890).—Hemsley in Hooker's Icon. XXIX. t. 2834, fig. 1–3 (1907).

West Wu yuan, alt. 1000 m., in woods, *R. C. Ching*, no. 3250, August 17, 1925 (tree 15 m. tall, girth of trunk 1.2 m., rare).

Corylopsis sinensis Hemsley in Gard. Chron. ser. 3, XXXIX. 18, fig. 12 (1906); in Hooker's Icon. XXIX. t. 2820, fig. 17–20 (1906).

Chu hwa shan, scrub clad slopes, *R. C. Ching*, no. 2598, Herb. Univ. Nanking no. 7523, April 28, 1925 (bush 5 m. high, flowers pale yellow, common); Wang si che, south Chu hwa shan, alt. 650 m., *R. C. Ching*, no. 2849, June 29, 1925 (shrub 8 m. tall, common); Chi yuen sze, Chu hwa shan, alt. 1000 m., *A. N. Steward*, no. 1132, Herb. Univ. Nanking no. 5261, April 24, 1924 (bush 5 m. high).

Corylopsis Veitchiana Bean in Bot. Mag. CXXXVI. t. 8349 (1910).

Wang shan, alt. 800 m., woods, *R. C. Ching*, no. 2965, July 12, 1925 (bush 10 m. high; common); without locality, *R. C. Ching*, no. 2728, in 1925 (flowering branches).

Corylopsis platypetala Rehder & Wilson in Sargent, Pl. Wilson. I. 426 (1913).

Wang shan, alt. 860 m., wooded ravine, *R. C. Ching*, no. 3064, July 20, 1925 (bush 8 m. high, common); same locality, woods and thickets, *K. Ling*, nos. 1161 and 1217, Herb. Univ. Nanking nos. 7736 and 9615, August 9, 12, 1924 (very common).

Fortunearia sinensis Rehder & Wilson in Sargent, Pl. Wilson. I. 428 (1913).—Rehder in Jour. Arnold Arb. V. 166 (1924).

Chu hwa shan, in woods, *R. C. Ching*, no. 2647, Herb. Univ. Nanking no. 7575, May 1, 1925 (tree 15 m. tall, girth of trunk 0.9 m.; rare); Wang shan, alt. 750 m., woods, *R. C. Ching*, no. 2970, July 12, 1925 (tree 13 m. tall, girth of trunk 0.7 m.; common); Bau hwa shan, *A. N. Steward*, Herb. Univ. Nanking no. 2147, June 7, 1922; Chuchow, without collector's name, Herb. Univ. Nanking, no. 362, June 26, 1920.

Loropetalum chinense Oliver in Trans. Linn. Soc. XXIII. 459, fig. 4 (1862).—Hemsley in Bot. Mag. CXXX. t. 7979 (1904).

Hamamelis chinensis R. Brown in Abel, Narr. Jour. China, 376, fig. (1818).

Wang shan, alt. 330 m., thickets, *R. C. Ching*, no. 3056, July 20, 1925 (bush 11 m. high, very common); same locality, alt. 1200 m., *K. Ling* no. 1216, Herb. Univ. Nanking no. 7777, August 12, 1924; Wu yuan, roadside thickets, *R. C. Ching*, no. 3284, August 29, 1925, (bush 6 m. high, very common); same locality, alt. 600 m., *N. K. Ip*, no. 53, Herb. Univ. Nanking no. 7676, August 19, 1924 (bush 5 m. high); Chu hwa shan, Hsia ken, alt. 300 m., *A. N. Steward*, no. 1113, Herb. Univ. Nanking no. 5242, April 22, 1924.

Hamamelis mollis Oliver in Hooker's Icon. XVIII. t. 1742 (1888).—Hooker f. in Bot. Mag. CXXIX. t. 7884 (1903).

Wang shan, alt. 650 m., *R. C. Ching*, no. 2960, July 12, 1925 (bush 5 m. high, rare); same locality, alt. 680 m., *K. Ling*, no. 1205, Herb. Univ. Nanking no. 7766, August 12, 1924 (bush 3 m. high).

ROSACEAE

Determined by E. H. WILSON (except Spiraea, Malus and Pyrus)

Stephanandra chinensis Hance in Jour. Bot. XX. 210 (1882).—Rehder in Sargent, Pl. Wilson. I. 437 (1913); in Jour. Arnold Arb. V. 167 (1924). Chu hwa shan, open thickets, alt. 650 m., *R. C. Ching*, nos. 2659 and 2777, May 1, June 27, 1925 (bush 2–2.5 m. high, common).

Spiraea (determined by A. REHDER).

Spiraea cantoniensis Loureiro, Fl. Cochinch. 322 (1791).
Spiraea Reevesiana Lindley in Bot. Reg. XXX. t. 10 (1844).

Li kau, west of Chemen, alt. 100 m., *R. C. Ching*, no. 3158, August 7, 1925; west of Kweichou city, alt. 130 m., *R. C. Ching*, no. 3343, September 10, 1925 (shrub 3 m. tall).

The leaves of the specimens cited above are comparatively long and narrow measuring about 4–7 cm. in length and 1–2 cm. in width.

Spiraea Blumei G. Don, Gen. Syst. II. 518 (1832).—Schneider, Ill. Handb. Laubholzk. I. 465, fig. 290 v-x, 291 h (1905).

Tien tai, Chu hwa shan, alt. 1150 m., *R. C. Ching*, no. 2819, June 28, 1925; Wang shan, alt. 1200 m., *R. C. Ching*, no. 2991, July 13, 1925.

Spiraea hirsuta Schneid. var. **rotundifolia** Rehder in Sargent, Pl. Wilson I. 445 (1913).
Spiraea Maximowicziana Schneider, Ill. Handb. Laubholzk. I. 461 (1905).

Between Tang kow and King chuen, Wang shan, alt. 650 m., *N. K. Ip*, no. 26, Herb. Univ. Nanking no. 7654, August 14, 1924; Ye hsien, alt. 400 m., *R. C. Ching*, no. 3076, July 21, 1925.

This Spiraea is perhaps distinct enough to be considered a species under the name proposed by Schneider.

Spiraea chinensis Maximowicz in Act. Hort. Petrop. VI. 193 (1879).
Spiraea pubescens Lindley in Bot. Reg. XXXIII. t. 38 (1847).—Non Turczaninow.

Chu hwa shan, alt. 900 m., *A. N. Steward*, no. 1186, Herb. Univ. Nanking no. 5303, April 25, 1922; same locality, *R. C. Ching*, nos. 24643 (Herb. Univ. Nanking no. 7571) and 2754, May 1 and June 27, 1925; Wang shan, *K. Ling*, no. 1244, Herb. Univ. Nanking no. 7795, August 14, 1924; same locality, alt. 1300 m., *R. C. Ching*, no. 3041, July 17, 1925.

All the specimens cited above differ from typical *S. chinensis* in being less densely pubescent, in Steward's no. 1186 and K. Ling's no. 1244 the pubescence of the inflorescence having nearly or entirely disappeared, but the follicles are pubescent which shows that the specimens belong neither to *S. pubescens* Turcz. nor to *S. Blumei* Don.

Spiraea japonica L. f. var. **Fortunei** Rehder in Bailey, Cycl. Am. Hort. IV. 1703 (1902).

Spiraea Fortunei Planchon in Fl. des Serres IX. 35, t. 871 (1853).—Hooker in Bot. Mag. LXXXVI. t. 5164 (1860).

I hsien, *K. Ling*, no. 1262, Herb. Univ. Nanking no. 7806, August 15, 1924.

Spirea japonica var. **acuminata** Franchet in Nouv. Arch. Mus. Paris, sér. 2, VIII. 218 (Pl. David. II. 36) (1885).

Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2835, June 28, 1925; Li shan, alt. 100 m., *R. C. Ching*, no. 3140, August 5, 1925.

The two specimens cited above look quite distinct; no. 2835 agrees with Franchet's description in the glaucescent and grayish pubescent under surface, but the serration is not very deep nor decidedly double, while no. 3140 has deeply doubly serrate leaves as described by Franchet but the under surface is green and the pubescence is of a different more pilose character.

Exochorda Giraldii Hesse in Mitteil. Deutsch. Dendr. Ges. XVII. 191, 219 (1908); XVIII. 295, fig. (1909).—Rehder in Jour. Arnold Arb. V. 174 (1924).

Exochorda racemosa var. *Giraldii* Rehder in Sargent, Pl. Wilson. I. 457 (1913).

Li shan, northwest Chemen, alt. 200 m., wooded ravine, *R. C. Ching*, no. 3104, August 3, 1925 (bush 6 m. high, rare); without precise locality, *R. C. Ching*, no. 2726, in 1925 (flowering specimens).

Cotoneaster hupehensis Rehder & Wilson in Sargent, Pl. Wilson. I. 169 (1912).

Chuchow, Lang ya sze, *A. N. Steward*, Herb. Univ. Nanking no. 2329, June 15, 1922; Wang shan, alt. 1800 m., *A. N. Steward*, no. 1270, Herb. Univ. Nanking no. 7142, August 7, 1924 (bush 2 m. high); She teh hsien, *K. Ling*, no. 1129, Herb. Univ. Nanking no. 7718, August 7, 1924.

Crataegus cuneata Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 130 (Fl. Jap. Fam. Nat. I. 22) (1846).—Hance in Jour. Bot. XVI. 11 (1878).—Lavallée, Icon. Arb. Segrez. 13, t. 5 (1885).

Mespilus cuneata K. Koch in Wochenschr. Gaertn. Pflanzenk. V. 338 (1862).

Chu hwa shan, *R. C. Ching*, no. 2669, Herb. Univ. Nanking no. 7597, May 2, 1925 (bush 2.5 m. high, flowers white, fragrant); Wu yuan, alt. 650 m., *R. C. Ching*, no. 3256, August 18, 1925 (bush 2.5 m. high, fruit bright red; common); without locality, *R. C. Ching*, no. 2735, in 1925; Wu yuan, *K. Ling*, no. 1318, Herb. Univ. Nanking no. 7856, August 24, 1924.

Sorbus alnifolia K. Koch in Ann. Mus. Bot. Lugd.-Bat. I. 249 (1864).—Rehder in Jour. Arnold Arb. v. 183 (1924).

Crataegus alnifolia Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 130 (Fl. Jap. Fam. Nat. I. 22) (1845).

Aria alnifolia Decaisne in Nouv. Arch. Mus. Paris, x. 166 (Mém. Fam. Pom.) (1874).

Pyrus alnifolia Franchet & Savatier, Enum. Pl. Jap. II. 350 (1879).—Hooker f. in Bot. Mag. CXXVII. t. 7773 (1901).—Non Lindley.

Micromeles alnifolia Koehne, Gatt. Pom. 21 (1890); in Gartenfl. XLI. 282, fig. 61–62 (1892).

Pyrus Miyabei Sargent in Garden & Forest, VI. 214 (1893); VII. 84, fig. 19 (1894).

Chu hwa shan, Tien tai, alt. 1300 m., thickets, *R. C. Ching*, no. 2790, June 28, 1925 (tree 11 m. tall, fairly common); Wang shan, alt. 1550 m., woods, *R. C. Ching*, no. 3013, July 15, 1925 (tree 6 m. tall; common).

Sorbus Folgneri Rehder in Sargent, Pl. Wilson. II. 271 (1915); in Jour. Arnold Arb. v. 184 (1924).

Micromeles Folgneri Schneider in Bull. Herb. Boissier, sér. 2, VI. 318 (1906); Ill. Handb. Laubholzk. I. 704, fig. 386 q, 387 n-n^1 (1906).

Pyrus Folgneri Léveillé, Fl. Kouy-Tchéou, 350 (1914–15).—Bean, Trees & Shrubs Brit. Isles II. 283 (1914).

Chu hwa shan, Wang si che, alt. 600 m., thickets, *R. C. Ching*, no. 2869, June 30, 1925 (tree 6 m. tall, rare); Wu yuan, Chang gon shan, alt. 800 m., *R. C. Ching*, no. 3223, August 16, 1925 (tree 13 m. tall, girth of trunk 0.6 m., rare).

Sorbus Dunnii Rehder in Sargent, Pl. Wilson. II. 273 (1915).

Wang shan, *K. Ling*, no. 1163, Herb. Univ. Nanking no. 7738, August 9, 1925.

This species has subglobose fruits with a deciduous calyx; the primary and secondary veins on the underside of the leaf are clothed with rufous tomentum.

Sorbus spec.

Wang shan, alt. 1300 m., wooded cliffs, *R. C. Ching*, no. 2950, July 12, 1925 (tree 6–10 m. tall, common); same locality, alt. 2050 m., *K. Ling*, no. 1206, Herb. Univ. Nanking no. 7767, August 12, 1924 (tree 3 m. tall), in Herb. Univ. California.

Probably a new species related to *Sorbus commixta* Hedl. of Japan, but the material which is in immature fruit is too fragmentary for proper identification.

Photina serrulata Lindley in Trans. Linn. Soc. XIII. 103 (1821). (Exclud. syn. *Crataegus glabra* Thunberg.)

Crataegus glabra Loddiges, Bot. Cab. III. t. 248 (1818).—Sims in Bot. Mag. XLVII. t. 2105 (1820).

Chu hwa shan, alt. 1800 m., *K. Ling*, no. 2052, Herb. Univ. Nanking no. 7294, April 25, 1924 (tree 11 m. tall, girth of trunk 0.4 m., flowers white).

Photinia Davidsoniae Rehder & Wilson in Sargent, Pl. Wilson. I. 185 (1912).

Chemen, alt. 100 m., *R. C. Ching*, no. 3167, August 8, 1925 (tree 8 m. tall, girth of trunk 1 m., rare); without locality, *R. C. Ching*, no. 2517, in 1925; Wu yuan, alt. 130 m., woods, *R. C. Ching*, no. 3272, August 21, 1925 (tree 20 m. tall, girth of trunk 2 m., bark cinnamon-brown; rare); same locality, alt. 450 m., *K. Ling*, no. 1308, Herb. Univ. Nanking no. 7846, August 23, 1924 (tree 7 m. tall, girth of trunk 0.3 m.).

Photinia subumbellata Rehder & Wilson in Sargent, Pl. Wilson. I. 189 (1912).

Wang shan, alt. 600 m., woods, *R. C. Ching*, no. 2912, July 5, 1925 (bush 3 m. high).

Photinia villosa De Candolle, Prodr. II. 631 (1825).—Sargent in Garden & Forrest I. 67, fig. 12 (1888).

Crataegus villosa Thunberg, Fl. Jap. 201 (1784).

Pourthiaea villosa Decaisne in Nouv. Arch. Mus. Paris, X. 147, 149 (1874).—Shirasawa, Icon. Ess. For. Jap. I. t. 29, fig. 1–13 (1900).

Photinia variabilis Hemsley in Jour. Linn. Soc. XXIII. 263 (1887), in part.

Chu hwa shan, *R. C. Ching*, no. 2691, Herb. Univ. Nanking no. 7619, May 2, 1925 (tree 10 m. tall; common).

Photinia villosa var. **sinica** Rehder & Wilson in Sargent, Pl. Wilson. I. 186 (1912).

Wang shan, alt. 1400 m., thickets, *R. C. Ching*, no. 3040, July 15, 1925 (bush 5 m. high).

Photinia Beauverdiana Schneider in Bull. Herb. Boiss. sér. 2, VI. 319 (1906); Ill. Handb. Laubholzk. I. 710, fig. 393 p-q (1906).

Chu hwa shan, woods, *R. C. Ching*, no. 2623, Herb. Univ. Nanking no. 7550, April 29, 1925 (tree 6 m. tall, common); same locality, Tien tai, *R. C. Ching*, no. 2824, June 28, 1925 (bush 6 m. tall, common); Wang shan, thickets and rocky cliffs, *R. C. Ching*, no. 3003, July 13, 1925 (bush 8 m. high).

Photinia Beauverdiana var. **brevifolia** Cardot in Lecomte, Not. Syst. III. 378 (1918).

Wu yuan, Chang gon shan, alt. 800 m., woods, *R. C. Ching*, no. 3231, August 16, 1925 (tree 6 m. tall, common).

Raphiolepis indica Lindley apud Ker in Bot. Reg. VI. 465 (1820), descript. et fig. exclud.—De Candolle, Prodr. II. 630 (1825).—Nakai in Jour. Arnold Arb. v. 65 (1924).

Crataegus indica Linnaeus Spec. 477 (1753).—Sims in Bot. Mag. XLI. t. 1726 (1815).

Wang shan, alt. 600 m., thickets, *R. C. Ching*, no. 2932, July 11, 1925 (bush 6 m. high; rare); same locality, between Tang kong and Kong chuen, alt. 1100 m., *N. K. Ip*, no. 27, Herb. Univ. Nanking no. 7655, August 14, 1924 (bush 3 m. high).

Chaenomeles sinensis Koehne, Gatt. Pomac. 29 (1896), sub. "C. chinensis."—Rehder in Jour. Arnold Arb. v. 186 (1924).

Cydonia sinensis Thouin in Ann. Mus. Paris, XIX. 145 t. 8, 9 (1812).

Wang shan, alt. 600 m., *R. C. Ching*, no. 2934, July 11, 1925 (tree 11 m. tall, bark greyish brown; rare).

Malus (determined by A. REHDER).

Malus theifera Rehder in Sargent, Pl. Wilson. II. 283 (1915).—Chun, Chin. Econ. Trees, 173, fig. 65 (1923).

Kimen, *N. K. Ip*, Herb. Univ. Nanking no. 4799, August 22, 1923; T'au k'ou, Wang shan, *K. Ling*, no. 1251, Herb. Univ. Nanking no. 7799, August 14, 1924; Chu hwa shan, *R. C. Ching*, no. 2607, April 28, 1925 (tree 9 m. tall); Wang si che, Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2844, June 29, 1925 (shrub 4 m. tall); Wang shan, alt. 1250 m., *R. C. Ching*, no. 3051, July 19, 1925.

Malus formosana Kawakami in Tokyo Bot. Mag. XXV. 145, t. 4 (1911).

Wang shan, alt. 800 m., *K. Ling*, no. 1145, Herb. Univ. Nanking, no 7727, August 9, 1924; same locality, alt. 600 m., *R. C. Ching*, no. 2906, July 5, 1925 (shrub 8 m. tall).

Pyrus (determined by A. REHDER).

Pyrus betulaefolia Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833).—Decaisne, Jard. Fruit. I. t. 20 (1872).—Sargent in Gard. & For. VII. 224, fig. 39 (1894).

Chuchow, Herb. Univ. Nanking no. 952, April 13, 1921; Kien ping, Herb. Univ. Nanking no. 1608, September 3, 1921; Tsinan fu, Kao ping fang, Herb. Univ. Nanking no. 2941, October 1922; foot of Chu hwa shan, *R. C. Ching* no. 2720, April 28, 1925; Tatung, alt. 100 m., *R. C. Ching*, no. 2742, June 25, 1925 (tree 20 m. tall).

Pyrus Calleryana Decaisne, Jard. Fruit. I. in text of t. 8 (1872).—Nakai Fl. Sylv. Kor. VI. 55, t. 25 (1916).

Su chow fu, *S. N. Lei*, Herb. Univ. Nanking no. 2982, September 25, 1922; Kimen hsien, alt. 300 m., *N. K. Ip*, Herb. Univ. Nanking no. 4780, August 28, 1923; Heh hsien, *K. Ling*, no. 1257, Herb. Univ. Nanking no. 7802, August 14, 1924; Tien tai shan, Chu hwa shan, *A. N. Steward*,

no. 1174, Herb. Univ. Nanking no. 5295, April 25, 1924; same locality, alt. 950, *R. C. Ching*, no. 2830, June 28, 1925; Chu hwa shan, *R. C. Ching*, no. 2612, Herb. Univ. Nanking no. 7537, April 29, 1925; Su hsien, alt. 300 m., *R. C. Ching*, no. 3093, July 27, 1925 (shrub 6.5 m. tall); Wu yuan, *R. C. Ching*, no. 3252, August 17, 1925 (shrub 10 m. tall).

The specimens collected by Lei and by Ip differ in their generally broader and quite glabrous leaves from the other specimens which are ferrugineous-pubescent on the midrib beneath and also on the pedicels and calyx of the flowering specimens; in Ip's specimen the calyx appears to be persistent.

Pyrus Calleryana var. **lanceata** Rehder in Jour. Arnold Arb. VII. 28 (1926).

Shih tai hsien, *A. N. Steward*, Herb. Univ. Nanking no. 5486, August, 1924 (type); Yu ting, *N. K. Ip*, Herb. Univ. Nanking no. 4800, August 24, 1923; Wy yuen, alt. 550 m., *N. K. Ip*, no. 57, Herb. Univ. Nanking no. 7680, August 19, 1924; south of Chu hwa shan, alt. 130 m., *R. C. Ching*, no. 2893, July 3, 1925.

Rhodotypus scandens Makino in Tokyo Bot. Mag. XXVII. 126 (1913).

Corchorus scandens Thunberg in Trans. Linn. Soc. II. 335 (1793).

Keria tetrapetala Siebold in Verh. Bataav. Genoot. XII. 69 (Syn. Pl. Oec. Jap.) (1830), nomen nud.

Rhodotypus kerrioides Siebold & Zuccarini, Fl. Jap. I. 185 t. 99, fig. 1 (1841).—Hooker f. in Bot. Mag. XCV. t. 5805 (1869).

Rhodotypus tetrapetala Makino in Tokyo Bot. Mag. XVII. 13 (1903).

Chu chow, *L. F. Tsu*, Herb. Univ. Nanking no. 399, April 14, 1921.

Kerria japonica De Candolle in Trans. Linn. Soc. XII. 157 (1817); Prodr. II. 541 (1825).—Lindley in Bot. Reg. XXII. t. 1873 (1836).—Hemsley in Jour. Linn. Soc. XXIII. 229 (1887).

Rubus japonicus Linnaeus, Mant. I. 145 (1767).

Corchorus japonicus Thunberg. Fl. Jap. 227 (1784).

Spiraea japonica Desvaux in Mém. Soc. Linn. Paris, I. 25 (1822).—Non Linnaeus f.

Chu hwa shan, moist places, alt. 330 m., *R. C. Ching*, nos. 2594 (Herb. Univ. Nanking no. 7519) and 2770, April 28 and June 26, 1925 (bush 2–2.5 m. high, flowers yellow; common); same locality, Chi yuen sze, alt. 330 m., *A. N. Steward*, no. 1130, Herb. Univ. Nanking no. 5259, April 24, 1924 (bush 2 m. high, flowers yellow-orange); Wang shan, alt. 700 m., *N. K. Ip*, no. 32, Herb. Univ. Nanking no. 7658, August 14, 1924 (bush, flowers yellow); same locality, *K. Ling*, no. 1228, Herb. Univ. Nanking no. 7785, August 12, 1924.

Kerria japonica var. **pleniflora** Witte, Fl. Nederl. Tuin. 261, t. 66 (1868).

Keria japonica var. *β flore pleno* Sims in Bot. Mag. XXXII., t. 1296 (1810).

East, city of Kweichow, alt. 160 m., *R. C. Ching*, no. 3333, September 10, 1925 (bush 3 m. high; rare).

Rubus Buergeri Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 36 (1867); Prol. Fl. Jap. 224 (1866–67).

Chemen, alt. 600 m., *R. C. Ching*, no. 3122, August 5, 1925 (rare).

Rubus Swinhoii, Hance in Ann. Sci. Nat. Paris, sér. 5, v. 211 (1866).—Hemsley in Jour. Linn. Soc. XXIII. 237 (1887).

Chu hwa shan, alt. 330 m., thickets, *R. C. Ching*, nos. 2679 (Herb. Univ. Nanking no. 7607) and 2763, May 2 and June 26, 1925 (shrub, climbing 3–6 m. high, fruit deep purple; common).

Rubus tephrodes Hance in Jour. Bot. XII. 260 (1874).—Hemsley in Jour. Linn. Soc. XXIII. 238 (1887).

South Siunin, alt. 330 m., *R. C. Ching*, no. 3330, Sept. 7, 1925 (shrub 3 m. high; common).

Rubus Lambertianus var. **xanthoneurus** Focke in Bot. Jahrb. XXIX. 396 (1901).

Chemen, 100 m., *R. C. Ching*, no. 3170, August 8, 1925 (climber 3 m. high; fairly common); Ch'ang suin, *A. N. Steward*, no. 1357, Herb. Univ. Nanking no. 7227, August 14, 1924.

Rubus corchorifolius Linnaeus f., Suppl. Pl. Syst. Veget. 263 (1781).—Hemsley in Jour. Linn. Soc. XXIII. 230 (1887).

Chu hwa shan, *R. C. Ching*, nos. 2604 and 2710, Herb. Univ. Nanking nos. 7529 and 7637, April 28 and May 3, 1925 (3 m. high; common).

Rubus trianthus Focke in Bibl. Bot. LXXII. 140, fig. 59 (Spec. Rub.) (1911).

Chu hwa shan, gravelly hillsides, *R. C. Ching*, no. 2603, Herb. Univ. Nanking no. 7528, April 28, 1925 (bush 0.5 m. high; rare).

Rubus Thunbergii Siebold & Zuccarini in Abhand. Akad. Münch. IV. pt. II, 126 (Fl. Jap. Fam. Nat. I. 126) (1846).—Hemsley in Jour. Linn. Soc. XXIII. 238 (1887).

Chu hwa shan, open hillsides, *R. C. Ching*, no. 2692, Herb. Univ. Nanking no. 7620, May 2, 1925 (bush 0.75 m. high, common).—Same locality, Hsia ken, alt. 300 m., *A. N. Steward*, no. 1108, Herb. Univ. Nanking no. 5238, April 22, 1924 (bush 1 m. high, flowers white, fruit red, edible).

Rubus Chingii H. H. Hu in Jour. Arnold Arb. VI. 141 (1925), errore typograph. "*R. Chungii*"; VII. 70 (1926).

Chu hwa shan, brushy slopes, *R. C. Ching*, no. 2608, Herb. Univ. Nanking no. 7533, April 28, 1925 (erect shrub 3 m. high; common); same locality, alt. 1300 m., *K. Ling*, no. 2067, Herb. Univ. Nanking no. 7299, April 25, 1924 (bush 2 m. high, flowers white).

Rubus coreanus Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 34 (1867).—Hemsley in Jour. Linn. Soc. XXIII. 230 (1887).—Rehder in Jour. Arnold Arb. v. 186 (1924).

Liu chu wan, en route Chu hwa shan, alt. 330 m., *R. C. Ching*, no. 2752, June 26, 1925 (5 m. tall, fruit black; common).

Rubus innominatus S. Moore in Jour. Bot. XIII. 226 (1875).—Rehder in Jour. Arnold Arb. v. 198 (1924).

Chu hwa shan, thickets, *R. C. Ching*, no. 2781, June 27, 1925 (bush 2.5 m.; common).

Rubus spec.

Wang shan, back of Lion Ridge, alt. 1300 m., *R. C. Ching*, no. 2578, July 12, 1925 (1–5 m. high, common).

Apparently new species related to *R. trianthus* Focke with thin membranous leaves, often trilobed, and coarsely biserrate. The material consists of one specimen in ripe fruit which the collector says is red.

Rubus spec.

Ye hsien, alt. 330 m., *R. C. Ching*, no. 3095, July 27, 1925 (5 m. tall; common); Wang shan, alt. 600 m., *R. C. Ching*, no. 4130, Herb. Univ. Nanking no. 8521, July 5, 1925 (0.6 m. tall; common undergrowth); same locality, alt. 1100 m., *A. N. Steward*, no. 1259, Herb. Univ. Nanking no. 5498, August 9, 1924 (0.5 m. high, fruit red; not common).

Related to *R. flagelliflorus* Focke and probably new. The material is too fragmentary for accurate determination.

Rosa Gentiliana Léveillé & Vaniot in Bull. Soc. Bot. France, LV. 55 (1908).—Willmott, Gen. Rosa, II. 513, t. (1914).—Rehder & Wilson in Sargent, Pl. Wilson. II. 312 (1915).

Chu hwa shan, alt. 650 m., thickets, *R. C. Ching*, no. 2804, June 28, 1925 (climber 11 m. tall, common); same locality, Tien tai, alt. 1250 m., cliffs, *R. C. Ching*, no. 2831, June 28, 1925 (climber 10 m. tall, flowers white, fragrant); Wu yuan, *N. K. Ip*, no. 54, Herb. Univ. Nanking no. 7677, August 19, 1924 (climber).

Rosa spec.

Li shan, South Chemen, alt. 1300 m., *R. C. Ching*, no. 3110, August 5, 1925 (climber 6 m. tall; fairly common).

Possibly a new species related to *R. Soulieana* Crépin of western Szechuan, but the material is too poor for identification. It has glabrous leaves and shoots, two to three pairs of obovate, usually rounded, finely toothed leaflets, glandular pedicels and subglobose fruit.

Rosa laevigata Michaux, Fl. Bor. Am. I. 295 (1803).—Willmott, Gen. Rosa, I. 117, t. (1911).—Rehder & Wilson in Sargent, Pl. Wilson. II. 318 (1915).

Rosa sinica Aiton, Hort. Kew. II. 203 (1789).—Lindley, Ros. Monog. 126, t. 16 (1820).—Hooker in Bot. Mag. LV. t. 2847 (1828).—Non Linnaeus.

Rosa hystrix Lindley, Ros. Monog. 129, t. 17 (1820).

Chu hwa shan, open places, *R. C. Ching*, no. 2675, Herb. Univ. Nanking no. 7603, May 2, 1925 (climber 13 m. tall; very common); same

locality, Hsia ken, alt. 300 m., *A. N. Steward*, no. 1105, Herb. Univ. Nanking no. 5235, April 22, 1924; South Siunin, alt. 1300 m., *R. C. Ching*, no. 3320, Sept. 7, 1925 (climber 10 m. tall; common); Feng shui ling, alt. 400 m., *A. N. Steward*, no. 1241, Herb. Univ. Nanking no. 5481, August 6, 1924.

Rosa Roxburghii Trattinnick, Ros. Monog. II. 233 (1823).—Rehder & Wilson in Sargent, Pl. Wilson. II. 319 (1915).

Rosa microphylla Roxburgh apud Lindley, Ros. Monog. 9, 146 (1820).—Hooker in Bot. Mag. LXIII. t. 3490 (1836).—Hemsley in Jour. Linn. Soc. XXIII. 252 (1887).—Not Desfontaines.

Chu hwa shan, alt. 650 m., cultivated, *R. C. Ching*, no. 2862, June 29, 1925 (bush 2.5 m. high).

Rosa sertata Rolfe in Bot. Mag. CXXXIX. t. 8473 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 327 (1915).

Wang shan, alt. 1500 m., thickets, *R. C. Ching*, no. 3033, July 15, 1925 (bush 3 m. tall; common); same locality, alt. 1650 m., *R. C. Ching*, no. 3011, July 15, 1925 (bush 5 m. high, flowers rosy red, fragrant; common).

Prunus salicina Lindley in Trans. Hort. Soc. VII. 239 (1830).

Prunus triflora Roxburgh, Fl. Ind., ed. 2, II, 501 (1832).

Prunus ichangana Schneider in Fedde, Rep. Spec. Nov. I. 50 (1905).

West Chemen, alt. 100 m., open thickets, *R. C. Ching*, no. 3190, August 9, 1925 (tree 8 m. tall; common).

Prunus Persica Batsch, Beytr. & Entwürfe Pragm. Gesch. Naturr. 30 (1801).—Stokes, Bot. Mat. Med. III. 100 (1812).

Amygdalus Persica Linnaeus, Spec. 472 (1753).

Persica vulgaris Miller, Gard. Dict. ed. 8 (1768).

Chu hwa shan, cliffs, *R. C. Ching*, no. 2614, Herb. Univ. Nanking no. 7539, April 29, 1925 (tree 5 m. tall; common).

Prunus glandulosa Thunberg, Fl. Jap. 202 (1784).—Koehne in Mitt. Deutsch. Dendr. Ges. XVIII. 181, fig. 2 (1909).

Cerasus glandulosa Loiseleur in Nouv. Duhamel, v. 33 (1825).

Prunus japonica Hutchinson in Bot. Mag. CXXXV. t. 8260 (1909).—Non Thunberg.

Chu hwa shan, roadside thickets, *R. C. Ching*, no. 2708, Herb. Univ. Nanking no. 7635, May 3, 1925 (bush 1 m. high; common).

Prunus glandulosa f. **albiplena** Koehne in Sargent, Pl. Wilson. I. 264 (1912), "var. *glabra* f."

Cerasus japonica β. *multiplex* Seringe apud De Candolle, Prodr. II. 539 (1825), pro parte.

Prunus japonica var. *flore pleno*, Siebold & Zuccarini, Fl. Jap. I. 172, t. 90, f. iii. (1826), pro parte.

Chu hwa shan, cultivated, *R. C. Ching*, no. 2635, Herb. Univ. Nanking no. 7563, May 1, 1925 (bush 1.3 m. high).

Prunus subhirtella var. **ascendens** Wilson, Cherries of Japan, 10, t. 3, (1916).

Prunus Miqueliana Maximowicz in Bull. Acad. Sci. St. Pétersb. sér. 3, XXIX, 98 (1883), pro parte.

Prunus Herincquiana Koehne in Mitt. Deutsch. Dendr. Ges. XVIII. 175 (1909), pro parte.—Non Lavallée.

Prunus microlepis Koehne in Sargent, Pl. Wilson. I. 256 (1912).

Chu hwa shan, woods, *R. C. Ching*, no. 2630, Herb. Univ. Nanking no. 7558, April 30, 1925 (tree 20 m. tall, girth of trunk 1 m.).

Prunus serrulata var. **spontanea** Wilson, Cherries of Japan, 28 (1916).

Prunus Pseudo-Cerasus β. spontanea Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 102 (1883).—Shirasawa, Icon. Ess. For. Jap. II. t. 27, fig. 1–14 (1908).

Prunus tenuiflora Koehne in Sargent, Pl. Wilson. I. 209, (1912), pro parte.

Prunus densifolia Koehne in Fedde, Rep. Spec. Nov. XII. 135 (1913).

Chu hwa shan, exposed rocky ridges, *R. C. Ching*, no. 2615, Herb. Univ. Nanking no. 7540, April 29, 1925 (flowers faintly pink; common); same locality, T'ien T'ai shan, alt. 1500 m., *A. N. Steward*, no. 1165, Herb. Univ. Nanking no. 5288, April 25, 1924 (tree 7 m. tall, girth of trunk 0.45 m., flowers pink and white); same locality, alt. 1300 m., *R. C. Ching*, no. 2812, June 28, 1925 (tree 10 m. tall, bark shining brown; common above alt. of 1000 m.).

Prunus Dielsiana Schneider in Fedde, Rep. Spec. Nov. I. 68 (1905).—Koehne in Sargent, Pl. Wilson. I. 243 (1912).

Chu hwa shan, *R. C. Ching*, no. 2584, Herb. Univ. Nanking no. 7510, April 28, 1925 (tree 8 m. tall, flowers pink; common); same locality, Chi yuen sze, alt. 1100 m., *A. N. Steward*, no. 1142, Herb. Univ. Nanking no. 5270, April 24, 1924 (tree 8 m. tall, girth of trunk 0.45 m.).

Prunus perulata Koehne in Sargent, Pl. Wilson. I. 61 (1911).

Chu hwa shan, alt. 650 m., *R. C. Ching*, nos. 2606 and 2810, April 28 and June 28, 1925 (tree 18 to 20 m. tall, girth of trunk 1 to 1.5 m., bark dark gray, rough; common).

Prunus bicolor Koehne in Sargent, Pl. Wilson. I. 69 (1911).

Chu hwa shan, Tien, tai, alt. 1300 m., woods, *R. C. Ching*, no. 2858, June 29, 1925 (tree 20 m. tall, girth of trunk 1 m., bark gray, rough; common).

LEGUMINOSAE

Determined by A. REHDER

Albizzia julibrissin Durazzini in Mag. Tosc. III. pt. IV. 11 (1792).

Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking, no. 2313, June 14, 1922; Wang shan, *R. C. Ching*, no. 2930, July 5, 1925.

Albizzia kalkora Prain in Jour. As. Soc. Bengal, LXVI. 511 (1897); Novic. Ind. 345 (1905).

Tien tai, Chu hwa shan, alt. 100 m., *R. C. Ching*, no. 2829, June 28, 1925; Chemen, alt. 900 m., *R. C. Ching*, no. 3141, August 6, 1925.

Cercis chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 95 (Enum. Pl. Chin. Bor. 21) (1833).

Chu chow, *L. F. Tsu*, Herb. Univ. Nanking no. 437, April 13, 1921; Chu chow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no. 2306, June 14, 1922; Li shan, northwest Chemen, alt. 300 m., *R. C. Ching*, no. 3145, August 6, 1925.

Cercis Chingii Chun in Jour. Arnold Arb. VIII. 20 (1927).

Fifteen li east of Kweichow City, *R. C. Ching*, no. 3332, September 10, 1925 (type).

Gleditsia horrida Makino in Tokyo Bot. Mag. XVII. 12 (1903).

Gleditsia japonica Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 54 (1867).

Siunin, alt. 350 m., *R. C. Ching*, no. 3259, August 18, 1925.

Gleditsia sinensis Lamarck, Encycl. Méth. II. 465 (1786).

Chu hwa shan, alt. 550 m., *R. C. Ching*, no. 2863, June 30, 1925; east of Kweichow City, alt. 150 m., *R. C. Ching*, no. 3335, September 10, 1925.

Gymnocladus chinensis Baillon in Compt. Rend. Assoc. Franc. Avanc. Sci. III. 418, t. 4 (1875).

Chu hwa shan, alt. 500 m., *A. N. Steward*, no. 1122, Herb. Univ. Nanking no. 5251, April 23, 1924; Ma che, alt. 300 m., *R. C. Ching*, no. 3210, August 15, 1925.

Caesalpinia sepiaria Roxburgh, Fl. Ind. II. 360 (1824).

Ching yang hsien, *K. Ling*, no. 2012, Herb. Univ. Nanking no. 7290, April 22, 1924; Chu hwa shan, *R. C. Ching*, no. 2673, Herb. Univ. Nanking no. 7601, May 2, 1925.

Ormosia Henryi Prain in Jour. As. Soc. Bengal, LXIX. 180 (1900).

West Chemen, alt. 100 m., *R. C. Ching*, no. 3188, August 9, 1925 (tree 10 m. tall).

Sophora japonica Linnaeus, Mant. I. 68 (1767).

Hu shie, Herb. Univ. Nanking no. 1426, August 15, 1915; Wu yuan, *K. Ling*, no. 1334, Herb. Univ. Nanking no. 7870, August 24, 1924; west Wu yuan, alt. 200 m., *R. C. Ching*, no. 3265, August 21, 1925 (tree 28 m. tall).

Sophora flavescens Aiton, Hort. Kew. II. 43 (1789).

Chuchow, *A. N. Steward*, Herb. Univ. Nanking no. 2319, June 15, 1922; Hang chow, West Lake, *A. N. Steward*, Herb. Univ. Nanking no. 2380, June 21, 1922; Chu hua shan, Erh sun tien, alt. 300 m., *R. C. Ching*, no. 4037, Herb. Univ. Nanking no. 8437, June 26, 1925.

Cladrastis Wilsonii Takeda in Sargent, Pl. Wilson. II. 97 (1914).

Tien tai, Chu hwa shan, alt. 1150 m., *R. C. Ching*, no. 2817, June 28, 1925; Wang shan, alt. 600–7500 m., *R. C. Ching*, nos. 2940 and 2958, July 11 and 12, 1925 (tree 8–10 m.).

Indigofera Fortunei Craib in Not. Bot. Gard. Edinb. VIII. 53 (1913).

Indigofera venulosa Forbes & Hemsley in Jour. Linn. Soc. XXIII. 158 (1886).—Vix Champion.

Chuchow, Herb. Univ. Nanking no. 1070, May 5, 1920; Chu hwa shan, *R. C. Ching*, no. 2666, May 2, 1925.

Indigofera Kirilowii Maximowicz apud Palibin in Act. Hort. Petrop. XVII. 62, t. 4 (1899), in part.

Indigofera macrostachya Bunge in Mém. Div. Sav. Sci. St. Pétersb. II. 90 (Enum. Pl. Chin. Bor. 16) (1833).—Non Ventenat.

Wang shan, alt. 600 m., *R. C. Ching*, no. 3057, July 20, 1925.

Indigofera pseudotinctoria Matsumura in Bot. Mag. Tokyo, XVI. 62 (1902).—Craib in Not. Bot. Gard. Edinb. VIII. 69 (1913).

Chu hwa shan, Erh sun tien, alt. 950 m., *R. C. Ching*, no. 4026, Herb. Univ. Nanking no. 8426, June 26, 1925.

Millettia reticulata Bentham in Miquel, Pl. Junghuhn. I. 249 (1852).

Ye hsien, alt. 18 m., *R. C. Ching*, no. 3080, July 27, 1925.

Millettia Dielsiana Harms in Bot. Jahrb. XXIX. 412 (1900).

Chemen, alt. 130 m., *R. C. Ching*, no. 3200, August 13, 1925.

Wistaria sinensis Sweet, Hort. Brit. 121 (1827), "Wisteria."

Wisteria chinensis De Candolle, Prodr. II. 390 (1825).

Wang si che, south Chu hwa shan, alt. 550 m., *R. C. Ching*, no. 2870, June 30, 1925.

Wistaria japonica Siebold & Zuccarini, Fl. Jap. I. 88, t. 43 (1835).

Millettia japonica A. Gray in Mem. Am. Acad. n. ser. VI. 386 (1859).

Liu yung chi, alt. 250 m., *R. C. Ching*, no. 2881, June 30, 1925 (climber 7 m. high); Ye hsien, alt. 250 m., *R. C. Ching*, no. 3091, July 27, 1925.

This species has to my knowledge not been collected in China before. It is native of southern Japan and is found in southern Hondo, Shikoku and Kiushu.

Desmodium laburnifolium De Candolle, Prodr. II. 337 (1825).

Wu yuan, alt. 400 m., *N. K. Ip*, no. 72, Herb. Univ. Nanking, no. 7688, August 22, 1924; Li shan, Chemen, alt. 230 m., *R. C. Ching*, no. 3135, August 5, 1925.

Desmodium podocarpum De Candolle in Ann. Sci. Nat. IV. 102 (1825); Prodr. II. 336 (1825).

Wu lin lin, west Chemen, alt. 130 m., *R. C. Ching*, no. 4419, Herb. Univ. Nanking no. 8799, August 8, 1925.

Lespedeza Buergeri Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 47 (1867); Prol. Fl. Jap. 235 (1867).

Northern foot of Chu hwa shan, alt. 375 m., *R. C. Ching*, no. 2767, June 26, 1925; Wang shan, alt. 1200–1350 m., *R. C. Ching*, nos. 2993 and 2999, July 13, 1925.

Lespedeza formosa Koehne, Deutsch. Dendr. 343 (1893).

Lespedeza Sieboldi Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 47 (1867), excl. specim. Oldham no. 333; Prol. Fl. Jap. 235 (1867).

Wang shan, alt. 1300 m., *A. N. Steward*, no. 1284, Herb. Univ. Nanking no. 7156, August 11, 1924; south side of Wang shan, alt. 1150 m., *R. C. Ching*, no. 3067, July 30, 1925; Li shan, northwest Chemen, *R. C. Ching*, no. 3120, August 5, 1925; Chang gon shan, Wu yuan, alt. 900 m., *R. C. Ching*, no. 3234, August 17, 1925.

Ching's no. 3067 differs from the typical form in the acuminate leaflets and the less deeply divided calyx.

Lespedeza Fordii Schindler in Bot. Jahrb. XLIX. 586 (1913).

Tsi che, Wu yuan, alt. 500–600 m., *R. C. Ching*, nos. 3308 and 4609 (Herb. Univ. Nanking no. 8997), September 4, 1925.

Lespedeza daurica Schindler in Fedde, Rep. Spec. Nov. XXII. 274 (1926).

Lespedeza trichocarpa Persoon, Syn. Pl. II. 318 (1807).

Tsi che, Wu yuen, *R. C. Ching*, no. 4608, Herb. Univ. Nanking no. 8996, September 4, 1925.

Campylotropis macrocarpa Rehder in Sargent, Pl. Wilson. II. 113, in nota (1914).

Lespedeza macrocarpa Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 92 (Enum. Pl. Chin. Bor. 18) (1833).

Campylotropis chinensis Bunge in Mém. Kazan Univ. IV. 158 ? (Pl. Mongh.-Chin. Dec. I. 7) (1835).

South Kweichow, alt. 150 m., *R. C. Ching*, no. 4643, Herb. Univ. Nanking no. 9031, September 10, 1925; Wang shan, *R. C. Ching*, no. 2926, July 5, 1925.

Ching's no. 4643 has the under side of the leaves, the stem and pedunces covered with a dense yellowish soft pubescence, while no. 2926 is glabrescent and has the leaves only sparingly appressed-pubescent beneath and differs from the type in its short pedicels which are only 1.5–2 mm. long.

Dalbergia Hancei Bentham in Jour. Linn. Soc. IV. suppl. 44 (1860); Fl. Hongkong. 93 (1861).

Li liu, northwest Chemen, alt. 1300 m., *R. C. Ching*, no. 3097, August 3, 1925 (climber 20 m. high).

Dalbergia hupeana Hance in Jour. Bot. XX. 5 (1882).

Wang si che, south Chu hwa shan, alt. 500 m., *R. C. Ching*, no. 2872, June 30, 1925 (tree 17 m. tall); Li shan, northwest Chemen, alt. 230 m., *R. C. Ching*, no. 3146, August 6, 1925 (shrub 8 m. tall); south Siunin, alt. 130 m., *R. C. Ching*, no. 3317, September 7, 1925 (tree 12 m. tall).

(*To be continued*)

A PREVIOUSLY UNDESCRIBED SPECIES OF MANILTOA FROM PAPUA.

C. T. WHITE,

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Maniltoa lenticellata, n. sp.

Arbor magna (Lane-Poole), glabra, ramulis dense lenticellatis. Folia 4–5-jugata, petiolata, rhachi cum petiolo circiter 12 cm. longa, petiolo ipso 0.5 cm. longo; foliolis petiolulatis petiolulis 0.5 cm. longis, laminis plerumque 8 : 3.5 cm. magnis perobliquis ad basin cuneatis ad apicem longe acuminatis, acumine ipso 0.5–1 cm. longo emarginato. Racemi axillares, juventute bracteis majusculis imbricatis involucrati, bracteis exterioribus glabris, bracteis interioribus saepe pubescentibus, rhachi glabra vel subglabra 3–5 cm. longa; pedicelli glabri vel parce pubescentes, cum recaptaculo brevi 2.5 cm. longi, bracteolis 2 linearibus 6 mm. longis, altera 0.6 cm. altera 1 cm. supra basin pedicelli affixa; sepala circiter 1.5 : 0.5 cm. (?); petala angusta (?); stamina numerosa, circiter 1.7 cm. longa; ovarium glabrum, stipitatum stipite circiter 0.5 cm. longo. Legumen (paulum immaturum) oblique oblongum vel subovoideum, complanatum, circiter 2.5 cm. longum, 2 cm. latum, semine subreniformi 1.5 cm. longo 1 cm. lato.

PAPUA: Sageri, Northern Division. *C. E. Lane-Poole*, no. 203, July 1922 (flowering specimens; type); Budatobara, *L. J. Brass*, no. 779, December 1925 (fruiting specimens).

Collectors' Notes: A large tree, 8 ft. in girth with a bole of 60 ft. Large buttresses up to 6 ft. Bark grey, covered with small pustules, inner bark streaked with yellow. Native name Kaira (Buna District). A very hard wood, much thought of by natives; they make clubs of it and sometimes combs. (C. E. Lane-Poole.) A handsome tree 30 to 40 ft. with a rough brown bark; grows in riverine rain forests. (L. J. Brass).

Mr. L. J. Brass recently spent some months collecting in Papua on behalf of the Arnold Arboretum. His collections have been entrusted to me by Prof. Sargent for examination. Among the specimens received are several species of Maniltoa. I recognised the present species as one identical with flowering specimens collected in Papua by Mr. C. E. Lane-Poole and that had been put in our herbarium awaiting further material. Mr. Lane-Poole's specimens had been subjected to great pressure and it was rather difficult to make out the size and shape of the sepals and petals.

According to Harms' review of the genus in Lauterbach's "Beiträge zur Flora von Papuasien, VI" (in Bot. Jahrb. LV. 47–54. 1917) the present species would come between *M. Hollrungii* Harms and *M. Peekelii* Harms from both of which it is distinguished by its greater number of leaflets.

SWINGLEA, A NEW GENERIC NAME IN THE RUTACEAE

E. D. Merrill

In 1913 Dr. Walter T. Swingle[1] showed that the Philippine species described in 1837 as *Limonia glutinosa* Blanco represented a distinct generic type and adopted for it the name *Chaetospermum*, this in turn based on *Limonia*, subgenus *Chaetospermum* M. Roemer,[2] 1846, Roemer's subgeneric name in turn being based on *Limonia glutinosa* Blanco.

In raising this group to generic rank the fact was overlooked that in 1892 Saccardo[3] had used the same name for a genus of fungi in the family *Tuberculariaceae*, *Moniliales*, Fungi Imperfecti. It, therefore, becomes necessary to coin a new generic name for *Chaetospermum* (M. Roem.) Swingle 1913 (*Limonia*, subgen. *Chaetospermum* M. Roem. 1846), non *Chaetospermum* Saccardo 1892.

The genus is a monotypic one confined to the island of Luzon in the Philippines. The species is widely distributed at low and medium altitudes, occurring in thickets and in secondary forests from Isabela Province in northern Luzon to Tayabas Province in central Luzon. The adjusted synonymy is as follows:

Swinglea Merrill, nom. nov.

(*Limonia* Linn. subgen. *Chaetospermum* M. Roemer, 1846.—*Chaetospermum* Swingle, 1913, non Saccardo, 1892.)

Swinglea glutinosa (Blanco), comb. nov.

Limonia glutinosa Blanco, Fl. Filip. 358 (1837).
Feronia ternata Blanco, op. cit. ed. 2, 252 (1845); ed. 3, II. 104, t. 124 (1878).
Aegle decandra Naves apud Fernandez-Villar, Novis. App. Fl. Filip. 38 (1880).—Vidal, Sin. Fl. Filip. Atlas, 18, t. 25, fig. j (1883).—Merrill, Spec. Blanco. 19 (1918).
Aegle glutinosa Merrill in (Philip.) Govt. Labor. Publ. VI. 12 (1904); XVII. 29 (1905); Fl. Manila, 271 (1912).
Limonia Engleriana Perkins, Frag. Fl. Philip. 163 (1905).
Belou glutinosa Skeels in U. S. Dept. Agr. Bur. Pl. Ind. Bull. CLXII. 26 (1909).
Chaetospermum glutinosum Swingle in Jour. Wash. Acad. Sci. III. 102 (1913).—Merrill, Spec. Blanco. 203 (1918).

Limonia Engleriana Perk. published in 1905 was based on actual specimens, Dr. Perkins in describing it on the basis of flowering specimens only, not realizing that her species was identical with the much earlier *Limonia glutinosa* Blanco. All the other names are based on Blanco's original description, the several changes in the specific name being purely arbitrary ones and contrary to all codes of botanical nomenclature. The genus has been confused with *Feronia* and *Aegle* (*Belou*), from both of which it is abundantly distinct as shown by Dr. Swingle,

[1] Chaetospermum, a new genus of hard-shelled citrus fruits. Jour. Wash. Acad. Sci. III. 99–102, fig. 1 (1913).
[2] Roemer, M. J. Familiarum naturalium regni vegetabilis synopses monographicae, . . . (Hesperides) I. 39 (1846).
[3] Sylloge Fungorum X. 706 (1892).

who gives an amplified description of the species and discusses its generic relationships. The new generic name here proposed commemorates the work of Dr. Walter T. Swingle in the classification of the relatives of the genus *Citrus*.

ABIES CEPHALONICA Loudon.
Trees on the Panachaikon Mountain (type locality of A. panachaica Heldreich).

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A BOTANICAL JOURNEY IN GREECE IN THE SUMMER OF 1926[1]

JOH. MATTFELD

Plates 6 and 7

WITH great pleasure I accepted, in the spring of 1926, an offer from the director of the Arnold Arboretum, the late Professor C. S. Sargent, to undertake a botanical collecting tour through Greece and Bulgaria. As it was the purpose of the tour to make a collection as complete as possible of the representatives of the ligneous flora of the Balkan peninsula with special attention to critical species, I planned to start in May in southern Greece, to travel gradually northward and to go later from Saloniki through the southern Rhodope Mountains to Constantinople. From here I was to go through European Turkey (Strandja Mountain) to Bulgaria where I intended to collect during the second half of the summer. I soon found, however, that this program was much too extensive for one season, as a daily or frequent change of the collecting ground was made impossible by the limited means of travel in Greece, or, would have necessitated a large and too expensive a caravan to carry the baggage which would have to be rather large, since I was to collect several sets of specimens. Therefore, I could collect only from head-quarters which I would not need to change too often and consequently could not follow my original plan, but had to restrict my collecting to Greece. At the suggestion of Professor Diels Mr. Karl Schulz of the Berlin Botanic Museum accompanied me.

We arrived at Athens on May 5 after an interesting journey by train which carried us from the flora of central Europe through intermediate stages to the heart of the Mediterranean vegetation and gave us a glimpse of the character of the vegetation which was to occupy us during the coming half year. One of the principal objects of our visit to southern and central Greece was the study of the species of Abies described from these regions (*Abies cephalonica*, *A. panachaica*, *A. Reginae Amaliae*, *A. Apollinis*), which determined our route during the first time. After having gathered information regarding the ways and means of traveling in the country and having made short excursions to the Lykabettus and the Hymettus to become acquainted with the vegetation we went by steamer to Argostoli on the island of Cephalonia where we had the good

[1] Translated from the German manuscript by ALFRED REHDER.

fortune to meet Professor Bornmueller, the most prominent student of the eastern Mediterranean flora. As our program was almost identical, we could remain together for several weeks. Our first excursion took us to the Aenos Mountain, the type locality of *Abies cephalonica*. Contrary to the general idea that this Fir is here almost exterminated, we found wide slopes covered for long stretches with a fairly dense pure stand of this Fir from an altitude of about 800 m. nearly to the summit (1620 m.). The only shrub appearing here sparingly is a *Crataegus* (probably *C. Heldreichii*) which becomes more common only on the partly bare summit. The habit of the Fir is very characteristic; usually dividing low into several wide-spreading branches it forms a very broad and compact head. In favorable localities one finds groups of young trees. As the whole forest belongs to a hospital which preserves it as much as possible, there is little danger that the woods will be destroyed in the near future. Interesting is the difference between the leaves of the young and the old trees; the younger the tree the more acuminate and pungent are the leaves, while old trees on the sterile shoots have scarcely pungent and often even rather obtuse leaves; this seems important in regard to the systematic valuation of *Abies Apollinis* Link, described from the Parnassos and often recorded from northern Greece. Also a neighboring summit of the Aenos, the Roudhi Voumos, bears similar forests of this Fir, which differ, however, at least at the place we visited in harboring an undergrowth of a luxuriant maquis formation[1] and the whole is pervaded to such an extent with *Smilax aspera* that the forest becomes perfectly impenetrable; but below the Fir forests there exists only a very meagre phrygana formation[2] or a very low maquis down to the fairly steep limestone cliffs of the coastal region. Here Professor Bornmueller showed us the type locality, rediscovered by him, of the most interesting plant of the island: the endemic *Triadenia Webbii*, a shrub forming in a restricted locality rather high subglobose bushes.

Our next goal was the type locality of *Abies panachaica* on the Panachaikon Mountain (Voidhi Voumo) above Patras in the Peloponnesus. As, however, continuous rain prevented at first the ascent of the mountain, we paid a visit to the opposite coast of Acharnania where we took the train from Kryo Nero to Aetoliko (Anatoliko of some maps) and reached from here the impressive gorge, known under the Slavic name Klissura, which excels by far in its scenic beauty and interesting vegetation the Tempe valley between Ossa and Olympus famous since antiquity. Very high vertical limestone cliffs covered sparingly with a remarkable vegetation of perennial herbs leave only little room for the road, the dry bed of the river and for their talus-cones which are covered with a mixed growth, chiefly con-

[1] Maquis formation is a xerophilous formation and consists chiefly of a dense growth of evergreen shrubs and often low trees; it corresponds to the chapparal formation of California.—Ed.

[2] Phrygana formation is a xerophilous formation found on very dry, sandy or rocky hills and consisting chiefly of spiny shrubs or subshrubs, spiny herbs and grasses.—Ed.

sisting of tree-like *Quercus coccifera* mixed with *Pistacia Terebinthus*, *Cercis*, *Punica Granatum*, *Ruscus*, *Rosa*, *Smilax* and other shrubs. The following day (May 29) the sky shining in intense Mediterranean blueness we could effect the ascent of the Panachaikon Mountain. We intended to reach Kastrizi by carriage; with difficulty we could cross the Charadrus River, now shrunk to a small streamlet in the middle of the wide gravelly flood bed which was at this time covered with a beautiful mass of splendidly flowering *Nerium Oleander* and *Vitex agnus-castus* interspersed with *Platanus orientalis* and *Pistacia Lentiscus*, but reaching the deep bed of the Sklennais River we found the bridge gone and had to leave the carriage here to gain the village of Kastrizi on foot. The gentle slopes are here covered for long distances with the characteristic phrygana formation of globular bushes of *Genista acanthoclada* and *Poterium spinosum* with masses of *Spartium scoparium* and *Phlomis fruticosa* added, while *Quercus coccifera* and *Anthyllis Hermanniae* occur predominantly only above Kastrizi. The numerous small tributaries of the Sklennais River are bordered with a tall luxuriant growth of *Cotinus coggygria*, *Quercus lanuginosa*, and of the less common *Q. coccifera*, *Rosa* and *Pistacia Terebinthus*, while *Hedera helix* and *Adiantum capillus-Veneris* grow on the moist cliffs. From Kastrizi the road leads first over a ridge covered with a sparse phrygana vegetation (*Quercus coccifera*, *Anthyllis Hermanniae*, *Genista acanthoclada*, *Phlomis fruticosa*) and afterward through the gorge of the upper Sklennais up to the Fir forests which begin above the end of the valley at 700–800 m. altitude. Fine groves of Plane trees separated, however, by long bare stretches accompany the brook up to its steep and rilled source and on the upper slopes rather high tree-like *Quercus coccifera* appear. From above extend into these woods many Fir trees interspersed with some scattered trees of *Quercus aegilops* and *Q. lanuginosa*, while the open spaces are colored yellow by *Phlomis fruticosa* which in these altitudes is still in full bloom. Therefore, we find here within a small area a peculiarly varied vegetation; elements of the three, usually sharply separated chief altitudinal regions (maquis and phrygana, Oak, Fir) are here present in one locality which combines by its favorable orography the climatic limits for all three formations.

Farther up and on the mountain ridge pure Fir forests prevail; they extend over the ridge which separates the Sklennais from the Charadrus River up to the summit above Salmeniko. The trees are scattered and there are large open spaces which are now almost bare of vegetation. At an altitude of 800–900 m. solitary much browsed bushes of *Juniperus Oxycedrus* appear which begins to become more common at 1000-1100 m. altitude. Also *Genista acanthoclada* occurs frequently, but even this spiny shrub has been much browsed, and farther up a *Crataegus*, probably *C. Heldreichii*. The forest floor is in places covered with large rocks which are, unlike the rocks in some parts of the lower Fir forest of the Aenos, without vegetation except now and then small carpets of mosses

now nearly dried up. Drought and the intensive pasturing of large and numerous herds of goats and sheep, which are in all parts of the Balkan rabid destroyers of the flora and the greatest enemies of the botanist, are the cause that likewise the herbaceous vegetation is sparse, *Anthemis* (cf. *chia*), *Geranium lucidum*, *Armeria* sp. and a few annual herbs. This is also the cause that young growth can hardly be found; very young Firs I did not see at all. Somewhat older plants show the typical effects of severe browsing: a broad pointed cone from the middle of which a crown begins to develop. The old trees are as gnarled (see plate 6) as on the Aenos and in the leaves I could find no difference between this so-called *Abies panachaica* and the typical *A. cephalonica* from the Island of Cephalonia. From this description of the habit of the trees in the two localities it appears that the growth of these two Firs is very gnarled which is according to Heldreich the characteristic difference of the Arcadian *A. Reginae Amaliae*. To visit the region of the last named Fir we took the railroad from Patras around the Ziria Mountain whose seaward slopes are covered by a splendid forest of *Pinus halepensis* with a luxuriant maquis formation as undergrowth. From Diakophto we reached by a cog-wheel line Kalavryta, situated near the border of Arcadia about 700 m. above sea at the foot of the spurs of Mt. Vellia and Mt. Chelmos. Here the varied vegetation, the nearness of the high mountains Chelmos and Olonos and the easily accessible lower regions induced us to stay four weeks, longer than we had intended. Coming from the sea one finds in the lowest region the gentler slopes, the often very steep talus-cones of the mountains, rocky ledges and plateaus covered with a dense or partly open forest of *Pinus halepensis* interspersed with evergreen shrubs as *Arbutus Andrachne* and *A. Unedo* and *Myrtus communis*. Soon, however, the valley changes to a narrow gorge accessible only by the cog-wheel line. In the fissures of the cliffs grows a handsome *Chamaepeuce* in great masses, more rarely *Bupleurum fruticosum*, on the rocks climbs Ivy and many beautiful perennial herbs are in bloom. Sometimes the gorge becomes slightly wider and allows the formation of steep talus-cones and firmer rubble slopes covered with a luxuriant vegetation consisting chiefly of *Platanus orientalis* and *Fraxinus Ornus*, though also a wild form of *Ficus Carica*, *Quercus Ilex*, *Laurus nobilis*, tree-like *Phillyrea media* are frequent, all overgrown with *Smilax aspera*, *Vitis silvestris* and *Hedera helix*. On too dry and sunny slopes this vegetation changes with the same elements and others added to a more or less high maquis formation or in places to a scrub similar to a šibljak formation.[1] In this case the prevailing plants are *Quercus coccifera*, *Q. Ilex*, *Q. lanuginosa*, *Acer monspessulanum*, *Pistacia Terebinthus*, *Rhus coriaria*, *Prunus* (cf. *cerasifera*), *Asparagus aphyllus*, *Spartium junceum* and also some perennial herbs. This vegetation continues up to 550 m. altitude; higher up the evergreen ele-

[1] Šibljak formation consists of various deciduous shrubs or a single deciduous species covering the slopes of hills and of lower mountains.—Ed.

ments, except *Quercus coccifera*, drop out and in the bed of the brook only *Platanus orientalis* remains.

From the station Megaspilaeon (about 600 m. alt.) the cloister of the same name is reached by a steep trail over conglomerate rock, boulder and rubble slopes. On these dry and sunny slopes exists only a rather monotonous phrygana formation consisting chiefly of *Quercus coccifera*, *Juniperus Oxycedrus*, *Calycotome*, *Phlomis fruticosa*, *Spartium junceum*, *Hypericum empetrifolium*, *Helianthemum* sp., while *Pterocephalus parnassi*, *Asperula arcadiensis*, *Campanula rupestris*, *Silene*, *Aubrietia*, *Alkanna*, *Centranthus* etc. enliven the gray rocks with splashes of color. At an altitude of 800 m. the Fir forest enters into this formation, though here near the cloister, which at times houses many monks, the forest is much thinned out and on the individual trees the branches have been trimmed off to a great height, but on the neighboring mountains all slopes are covered with a beautiful Fir forest which farther up the valley descends to the bottom of the valley of the Vouraikos river, about 600 m. altitude. Near the forest below the cloister a somewhat higher maquis formation has developed consisting of *Quercus coccifera*, *Phillyrea media*, *Acer monspessulanum*, *Osyris alba* and *Asparagus*.

Shortly before Kalavryta the valley expands into a broad plain, which belongs to the Oak region, but only a few Oak trees remain, while the plain where it has not become marshy or covered with rubble is under cultivation, chiefly grapes and wheat, also almonds are grown. On the left side of the valley, however, on the slopes exposed to west-north-west stretches a well preserved high forest consisting of various forms of *Quercus conferta* and *Q. lanuginosa* with a plentiful addition of tree-like *Q. coccifera*, which as a shrub also forms a maquis under the trees.

On the side of the valley where Kalavryta is situated these deciduous Oak forests are lacking completely. The lower slopes of Castle Mountain, of the Mt. Vellia and also the hills toward the cloister Hagia Lawra are up to an altitude between 800 and 900 m. covered with a very low maquis formation poor in species, consisting almost exclusively of *Quercus coccifera* which is often associated with *Juniperus Oxycedrus*, occasional *Carpinus duinensis*, some *Cistus* and *Ligustrum vulgare;* these constitute the ligneous flora over wide stretches and even this is much browsed. Locally more favorable conditions (or protection) cause occasionally a more luxuriant development of the maquis, as in a small valley below the cloister Hagia Lawra where this formation reaches the height of about 3 m., consisting of *Quercus coccifera*, *Q. lanuginosa*, *Acer monspessulanum*, *Coronilla emeroides*, *Phillyrea media*, *Spartium junceum*, *Crataegus Heldreichii* and *C. monogyna*, *Juniperus Oxycedrus* and *Pyrus amygdaliformis*.

Castle Mountain crowned by a flattened block of limestone bears in its fissures a deciduous šibljak formation in which *Coronilla emeroides* and *Fraxinus Ornus* prevail, and besides *Lonicera*, *Tilia*, *Rhus*, *Ribes* (at 1000–1100 m. alt.), but *Quercus coccifera* is not yet lacking.

Here we enter the region of the Fir forest. It begins above the city at an altitude of about 800 m., solitary trees and in some places the whole forest descending to 750 and even to 700 m. altitude. Up to 1800 or 2000 m., varying locally, all the foot hills and spurs of Mt. Chelmos are covered with almost uninterrupted Fir forests. How extensive these forests are, may be imagined from the fact that we rode in ascending Mt. Chelmos from 3 o'clock to 9 o'clock in the morning, about 6 hours without interruption through pure Fir forests. Like the Fir forests described above this one also consists exclusively of *Abies cephalonica;* no other tree associates with it and even the shrubby undergrowth is very sparse and of few species. From below *Quercus coccifera* and *Juniperus Oxycedrus* enter the forest to some extent and are found particularly between rocks and on more open places; higher up one can observe *Crataegus Heldreichii*, and more rarely *C. pycnoloba*, *Lonicera nummulariifolia* and *Prunus pseudo-armeniaca;* *Juniperus Oxycedrus* is later replaced by *J. communis*, which in its procumbent form also covers the slopes above the tree-line. But these shrubs do not really belong to the interior of the forest, for they are found chiefly in more open places, as gravelly beds of brooks, fissured cliffs, road-sides and similar openings. They, therefore, do not belong to the formation of the Fir-forest, but appear here only as vegetation belonging to the same altitude. The forest itself is devoid of shrubby vegetation and the only smaller growth found here consists of its own progeny which one observes here and there particularly in more open places. The density of the forest changes very much according to the slant of the ground; on the more flat ground the trees may be much crowded, but the steeper and rockier the slopes are, the thinner the stand becomes. Regarding the shape of the individual trees we find here again quite frequently the gnarled and branched lyre-shaped trees already mentioned. Occasionally one sees on a thick horizontal limb a vertical branch which, though only $1\frac{1}{2}$ m. high, assumes already the shape of a miniature tree. It almost looks as if a seed had germinated and produced an epiphytic plant which of course is not the case. We also find here again a marked difference in the shape of the leaves on old and on young trees, while otherwise no difference from the Firs observed on the other mountains could be noticed. Therefore, it was not necessary to visit the type locality of *Abies Reginae Amaliae* in central Arcadia which, though not very far, is difficult to reach from Kalavryta. This species was distinguished by Heldreich chiefly by its peculiar way of growing; but the characters attributed to this species have been observed on the trees so far met with, and other forms as those observed could not be expected, since the high mountains from Chelmos to central Arcadia presuppose a certain continuity of the area of this Fir.

Between 1600 to 1700 m. altitude our road left the region of the Firs and lead to a large and dry alpine plain called Xerocampo, but the mountain ascending toward Kalavryta immediately above this plain and separated from the Chelmos massif by a narrow pass at about 2000 m.

altitude is covered almost to the summit (that is to about 2000 m. altitude) with a fairly dense Fir forest.

A real elfin-wood[1] region is lacking on the Chelmos as on all other Greek mountains, but here on the Chelmos it is indicated by a well-developed vegetation of a procumbent form of *Juniperus communis*, as it is but rarely to be observed to such an extent on other Greek mountains. Although it covers, as large green circular patches, the slopes above the Xerocampo, it is here not so dense and abundant as in the high Bulgarian mountains (e. g. in the Rila Mountains and Vitosha), where it is represented by a somewhat different form. At an altitude of about 1800 m. also this Juniper reaches its upper limit. The clumps of Juniper leave narrow or more often quite broad open spaces between or are lacking altogether and then another even more common shrub appears, *Daphne oleoides*, which replaces to a certain extent the alpine Rhododendrons here lacking, though it remains far behind the latter in the beauty of its flowers. Besides there are found here often in great quantity some spiny species of *Astragalus*, as *A. cylleneus* which extends downward to 600 or 700 m. altitude and *A. angustifolius* which is restricted to the alpine region and forms lower but denser, caespitose cushions. With these shrubs grow many beautiful herbs and perennials, while hardly any other shrub except *Acantholimon* which was not yet in bloom was found on this side up to the summit. Large cushions of herbaceous plants cover the slopes. If, however, one crosses the pass mentioned above and reaches the upper end of the valley above Sudenna, a few new shrubs may be seen; in the fissures of the deeply cleft limestone cliffs, on the slope of the valley exposed to the south, *Prunus prostrata* and *Globularia stygia* appear sparingly and patches of *Iberis sempervirens* greet the eye.

Again another picture present at an altitude of about 1700 m. the steep cliffs in the valley of the Styx which were investigated by Professor Bornmueller and Mr. Schulz. In the fissures grow *Acer Reginae Amaliae* which occasionally forms small stands and less plentiful *Amelanchier cretica* var. *chelmea*, *Rhamnus Sibthorpii*, *Cotoneaster tomentosa* and *Prunus prostrata*. Also a solitary crippled specimen of *Pinus nigra* was observed, which according to Halacsy and Orphanides is found occasionally on this side of the mountain in scattered individuals also in the Fir forest, as it is the case to a greater extent on the Taygetos.

The ascent of the Olonos on June 15th afforded an opportunity to compare its vegetation with that of the Chelmos. At first we had to cross on the road from Kalavryta to Hagios Vlassis at 700 to 800 m. altitude a very desolate region of which all the slopes were covered with a very meagre maquis formation of *Quercus coccifera* which only rarely was interspersed with other shrubs as *Coronilla emeroides* and *Acer monspessulanum*. On the slopes of the valley one notices besides Plane trees

[1] Elfin-wood and elfin-tree are terms proposed by W. R. Fisher in the English translation of Schimper's Pflanzengeographie (p. 704) for Knieholz or Krummholz.—Ed.

at the bottom often Oaks with tall trunks (*Quercus lanuginosa* and *Q. conferta*). The higher mountains south of the road all show very beautifully characteristic Fir forests.

Hagios Vlassis itself is situated in this region of maquis and Oak formations, but little above the town at about 800 m. altitude one enters a most beautiful Fir forest. Besides one-stemmed trees one sees many gnarled lyre-shaped ones, as in the other forests previously visited. Many Firs are inhabited by *Viscum album*. This forest is at first quite pure, but toward its upper limit solitary trees of *Juniperus foetidissima* appear between the Firs. Here as shrub and there as tree it extends along our path considerably beyond the limit of the Fir forest and one notices, soon after having become aware of the difference in appearance, that the slopes to the west bear above the Fir forest an open and apparently pure stand of this Juniper, but the elfin-wood formation of *Juniperus communis* is entirely lacking in the alpine region of the Olonos. Higher up in the crevices of the rocks one notices *Pyrus Aria* (*Sorbus Aria*) and on the slopes Roses, but everything which might be reached has been browsed by the many goats and sheep. On the 28th of June we left this region for Patras to ship our collections to Berlin and then went to Kastri (Delphi) where we enjoyed after six weeks' diet of mutton for the first time a civilized meal. The purpose of the trip to Delphi was to visit the type locality of *Abies Apollinis* described by Link from the Parnassos.

The fairly wide plains near Itea, below Delphi, form one large Olive plantation. Thousands and thousands of Olive trees yield here one of the chief articles of food of the Greeks. As our plant-presses were still filled, we collected on June 30th and the following day only on the steep cliffs above Delphi and toward Arachova. The herbaceous flora was already nearly dried up and burned and the ligneous flora was very meagre. Trees except the planted *Morus nigra* and *Platanus orientalis* are lacking, but in the crevices of the rocks one could observe a few shrubs, as *Rhamnus graeca* and another species, *Ruta*, *Juniperus phoenicea* sometimes developing into a small tree, *Quercus coccifera*, *Hypericum empetrifolium*, *Vitex agnus-castus* and a few other common shrubs.

On July 2d we started for the Fir region of the Parnassos. At first we had to cross above Delphi a very steep slope covered with a low maquis-formation of *Quercus coccifera* and *Juniperus phoenicea*. At about 1000 m. altitude we reached the Fir forest (see plate 7) and here also we met the well known gnarled shapes. If one expected to find here according to the description only forms with obtuse leaves, one soon notices that even old trees could bear very pointed and prickly leaves and forms with obtuse leaves we also had seen before. It may be stated that neither here nor at the previously visited localities could a trace of pubescence be found on the young shoots. Of other trees and shrubs recorded from the Parnassos we saw nothing on our way; they seemed to be restricted to the northern slope. At an altitude of about 1000 m. the Fir forest is

ABIES CEPHALONICA Loudon.
Forest on the Parnassos (type locality of A. Apollinis Link).

interrupted by the plateau of Levadhi which is partly cultivated and partly used as pasture. In the upper part of the forest at about 1600 m. altitude as on the Olonos scattered trees of *Juniperus foetidissima* appear, but pure stands of this tree were not seen. Of shrubs one observes at this altitude some Roses, *Prunus*, probably *P. pseudo-armeniaca*, and the just mentioned Juniper, while at lower altitudes *Juniperus Oxycedrus* is common and frequently and plentifully infested with *Arceuthobium Oxycedri*. Unfortunately our time did not allow us to penetrate far into the alpine region. We went up to about 2000 m. altitude where we found a vegetation not very different from that of the Olonos and Chelmos. In the rubble *Daphne oleoides* is again common and also *Astragalus parnassi* and another species, probably *A. angustifolius*, in the crevices occur here and there *Prunus prostrata*, *Rhamnus* spec. and more frequently *Pterocephalus parnassi*. Also procumbent bushes of *Juniperus foetidissima* and *J. communis* are not rare in some places. The descent we made toward Arachova and found on this side of the mountain the forest region rather narrow with the trees often very scattered which is perhaps the effect of artificial deforestation.

On the fourth day of July we left Delphi and the pleasant time we had enjoyed in the agreeable and instructive company of Professor Bornmueller came to an end, for he returned to Germany and we had to go to Athens to make preparations for our excursions to northern Greece and to procure letters of introduction for the visit to the Holy Mt. Athos and the Thracian border region. We utilized the time we had to wait in Athens by visiting the Parnes Mountain which seemed interesting as we had noticed before from the train large Fir forests on its upper regions.

We went by train from Athens to Menidhi from where one can make the ascent. Between Menidhi and the foot of the mountain one has to cross a broad talus-cone which is at first nearly horizontal and then only moderately sloping and is partly cultivated and partly used as pasture. The crops were harvested and everything dried up, only a low several-stemmed *Echinops* colored large stretches beautifully steel-blue. At about 200 m. altitude the real ascent begins and at the same altitude stands of *Pinus halepensis* appear, at first lower and young trees which, nevertheless, are already fruiting. Gradually this low growth changes to an open, high forest often interrupted, however, by extensive treeless slopes. These larger or smaller open spaces are covered with low maquis and phrygana vegetation in which the two formations are mixed in various ways, so that the separation of these formations is not always clear; *Quercus coccifera*, *Pistacia Lentiscus* and *P. Terebinthus*, *Juniperus phoenicea* (sparingly), *Poterium spinosum*, *Anthyllis Hermanniae*, *Cistus* spec., *Hypericum empetrifolium* and *Thymus capitatus* are the most important shrubby elements. Near the monastery Metochi, at about 500 m. alt. handsome trees of *Quercus aegilops* are found, and at the same altitude the vegetation changes in so far as the maquis formation becomes somewhat

higher, and *Myrtus communis*, *Arbutus*, *Juniperus Oxycedrus* and a species of *Thymelaea* play a more important part in it.

Farther up the Pine wood becomes occasionally somewhat denser and on the slopes and in the crevices of the limestone cliffs bloom still many beautiful herbs and perennials. Between 900 and 1000 m. altitude we find on the southern slope of the mountain the first Firs scattered between the Pines. Soon after this first appearance of the Firs the upper limit of *Pinus halepensis* is reached, but the slopes are still too steep and rocky to allow the formation of a dense Fir forest, only open stands and small groups can maintain themselves in favorable localities as outposts. As soon, however, as one has passed the saddle-shaped pass in the outer wall of the mountain and can overlook the interior with its high plateaus, flat broad ridges and the summits towering now not much higher, one sees from the region around the monastery Hagia Triadia up to the summit of the Karavota one continuous sea of Fir trees interrupted only here and there. These forests also are pure stands of *Abies cephalonica*, without the intermixture of any other tree; only at the monastery mentioned above one finds some immense planted *Juglans regia*. On more open places one observes the usual shrubs: *Juniperus Oxycedrus*, *Crataegus* spec., probably *Heldreichii*, and in addition a *Thymelaea* and a *Berberis*. The characters of the Firs are the same as described before from the more southern localities. Only regarding the habit it should be stated, that, besides some branched and gnarled forms, the slender one-stemmed trees are more common. It is probable that the branching of the tree as such does not constitute a distinctive character of *Abies cephalonica*, as in broad-leaved trees, but that this species has, in contrast to most others, the special faculty of producing after an injury to the terminal bud vertical continuations of the main stem from several lateral branches at the same time. In addition to this, latent buds of the old wood develop comparatively readily and form new stems. With a normal i. e. undisturbed growth, however, these possibilities do not come into play and only in consequence of injuries do they become effective. These injuries are in most cases caused by men, for the Greek rarely fells the whole tree, but cuts off branches or the upper part of young trees which thereby are only crippled, but not killed. They regenerate in the way described above and develop into the gnarled trees so commonly met with. Without doubt also natural causes may bring about similar injuries, particularly storm and frost, for often very violent desiccating storms occur even during the summer in the upper regions of the higher and also of the lower Greek mountains. This may explain why mountains like the Parnes, which on account of their comparatively low altitude are in this respect climatically favored and in which owing to their sparse population and bad roads very little wood is cut, contain such a large number of one-stemmed rather slender Fir trees.

On the fourteenth of August we were finally in possession of the necessary

papers and could leave Athens for the southernmost Pindus around Karpenission, the provincial capital of Eurytania. The train carried us the first day as far as Lamia; in rounding the Parnes we could ascertain that the forest of *Pinus halepensis* described above covers north of Menidhi the valley bottom and the low pass between the neighboring mountains Parnes and Pentelikon. Its undergrowth consists here of a very luxuriant maquis formation which also covers rather large spaces without the upper story of Pine trees and consists of *Arbutus*, *Pistacia Lentiscus* and *P. Terebinthus*, *Cistus*, *Phillyrea media*, *Calycotome*, *Anthyllis Hermanniae*, *Poterium spinosum* and some other shrubs which we could not definitely identify from the train, but very little *Quercus coccifera*.

The formerly large Kopais Lake is entirely drained and is now like the whole Boeotian plain under cultivation and very fertile. More interesting are the mountains which accompany the railroad on both sides, for one can observe from the train the usually clearly discernible Fir forests. By consulting the map one notices at once that only those mountains bear Fir forests which generally reach an altitude of more than 1350 m. and that on these mountains the Fir forests extend downward to 800 m. (for the Aenos mountain on Cephalonia which is 1650 m. high, the lower limit is given as 400 m., but this may be, if it is at all true, a special exception). All such mountains from Helikon in Attica to Oeta in Lokris, and also the Lokrian mountains, Saromata, bear Fir forests and have their Fir region, which often in large stands extends far down. In general one can probably state, that Firs exist only in those mountains which are higher than 1200 m. The fact that Firs are lacking in those mountains whose height is between 800 m. (the average lower limit of the Fir forests) and 1200 or up to 1350, may have some connection with the often discussed special climatic features caused by mass elevation, even if the climatic differences are minute as in our case.

After the railroad between Mavroneri and the Spercheios has crossed floristically apparently very interesting masses of rocks, it descends into the entirely cultivated but now burnt up plain of Lamia at the foot of the Othrys mountain. Cotton, melons, corn and wheat are the most important agricultural products here, but now almost everything has been harvested. The slopes of the Othrys appear over wide stretches quite bare; they are in their lower part covered with a very meagre phrygana formation of *Quercus coccifera*, only on the heights at the horizon one sees some groves of trees, probably Oaks. According to the information by a man of Lamia, however, there grow in a very distant valley of the interior of the mountain Firs and even Beeches.

While a visit of the heights immediately above Lamia showed us only their extremely meagre vegetation, an excursion to the opposite heights on the right side of the Spercheios, the south side of the Bay of Lamia, proved to be much more interesting. There are situated the Thermopylae, known to us from ancient Greek history, now famous as hot sulphurous

springs. The rather steep slopes of northern exposure cut by several small gorges are covered with a luxuriant maquis formation in which in contrast to the same formation of southern Greece *Paliurus aculeatus* plays an important part. Other important elements are *Quercus coccifera*, *Pistacia Lentiscus* and *P. Terebinthus*, *Phillyrea media*, *Cercis siliquastrum*, *Olea europaea* (the wild form also recognized by the peasants as such), *Punica granatum*, *Acer monspessulanum*, *Vitex agnus-castus*, *Crataegus* spec., *Ruta*, *Smilax aspera*, but *Arbutus* was lacking at least in these lower parts. Above these slopes on the plateaus of the summit we could see already the Firs which unfortunately we could not reach, since a violent dust storm forced us to return. The hot springs have encrusted the plain at the foot of these slopes over wide stretches with sulphur-sinter in which, besides some herbs, only *Pistacia lentiscus* in a few large bushes can exist.

On the sixteenth of July we went by mail-coach to Karpenision about 70 kilometers west of Lamia. The road follows for a long time, gradually ascending, the Spercheios river whose broad valley bottom is planted for great distances with tobacco. The slopes on its margin are either quite bare or covered with phrygana or low or sometimes somewhat higher maquis formations. To the south towers high and steep the mighty Oeta mountain on whose higher slopes we can discern extensive Fir forests. Gradually the road ascends to greater heights and in the landscape appear solitary large Oak trees and soon we can see to the southwest large Oak groves, but these stands are heavily cut and the individual trees look like telegraph-posts, for they have been robbed of their branches to a great height and only bear at the top a small almost brush-like crown. The maquis vegetation gradually disappears and deciduous shrubs gain the upper hand; the change occurs rapidly as soon as the road leaves the Spercheios valley and enters a side-valley at the left and climbs in close serpentine turns on a steep slope to the pass connecting at an altitude of 1200 m. the Veluchi massif with the Oxya mountain. At the left we see the heights of the famous forest of Muntzuraki covered below with Oaks, above with a dense growth of Firs, but we also reach quickly now the regions of the Firs. These forests at first are not pure, but between 900 and 1100 m. the Firs are copiously and often in large stands mixed with *Castanea satira*, a beautiful sight, for the Chestnut trees were just in full bloom. Further up, however, the Fir reigns alone. The ridge is slightly curved, but not very broad, and soon the road descends again through a pure growth of Firs. At the same height as before we see on the slopes of the Karpenisi here and there Chestnuts. Now the mighty massif of the Veluchi (Tymphrestos) dominates the whole landscape before us and promises interesting weeks. The road descends about 200 m. and then continues at about 1000 m. altitude at the same height until Karpenision is reached. The few available rooms are all occupied by summer guests and we can only get a very small one into which two beds are crowded, and which is sparingly lighted by a small window in the ceiling, and even this

belongs partly to an adjoining room. Mr. Schulz, therefore, had to dry the paper with a display of real heroism in the open market place under the gaping eyes of the assembled Hellenes; and while we were botanizing during the day, our nights were occupied by zoological pursuits: about 75 bed-bugs in 10 minutes time. Another difficulty presented itself in this city: toward the end of the month a great market took place to which thousands of mules and horses were brought together outside of the city, but nevertheless it was impossible during this time to obtain a single animal for carrying our baggage and we had to make strenuous trips of several days on foot.

Karpenision, at the foot of the steep Velouchi at about 1000 m. altitude, is very favorably situated for botanical excursions. About 100 m. below the city the Karpenisi river flows in a fairly broad bed filled with rubble which is on higher places cultivated, but also partly covered with deciduous shrubs. Toward the west and northwest stretch the lower foothills of the Velouchi massif which partly bear meadows and fields and partly shrubby vegetation, but are mostly covered with a beautiful dense Fir forest. To the south and south-west rise the steep and strangely shaped lime-stone summits of the Kaliakuda and Chelidoni, and in the south-east we divine on the broad ridge of the Oxya Mountain the southernmost Beech forests.

The line of about 1000 m. altitude is here apparently the average border line between the Oak and the Fir regions, but locally it differs according to the exposure and special climatic conditions, also the influence of man obliterates considerably the limits, though it consists only in destruction and not yet in afforestation. Above Karpenision the Firs start at an altitude of 1100–1200 m., or in some localities at 1300 or 1350 m. altitude, while the Oaks do not reach higher altitudes than 1000 to 1100 m. On the slopes of the opposite side of the valley, however, the Firs descend to 900–850 m. and farther down the river toward Megalochorio even to 800–750 m., but under these conditions the forests are more or less interspersed with deciduous Oaks and even tree-like *Quercus coccifera*. This exhausts, except the Plane trees which form long but rather narrow groves along the river, the forest-forming trees of this region. But even the Oaks do not form woods here, and it is doubtful whether even before the beginning of deforestation Oak forests of great size existed here, since the space adapted for the growth of Oak is much too small, for between the lower limit of the Fir region and the bottom of the river valley only a narrow zone or none at all is left, the river falling only from 1000 to 750 m. from above Karpenision down to the gorge near Megalochorio.

After this general description of the region the following notes will deal more in detail with some of the aspects of the ligneous flora. The rounded spurs of the Velouchi west of Karpenision are now deforested, but formerly they probably belonged to the Fir region. They support a rather scattered growth of shrubs and between them a luxuriant vegetation of herbs and

perennials. The individual bushes show typically the effect of browsing. Entire slopes are covered with *Spartium junceum*, while others bear chiefly *Carpinus duinensis* sparingly interspersed with *Juniperus Oxycedrus* which occasionally develops into a tree. Some *Populus nigra*, doubtless planted, and rarely a tall-stemmed *Quercus conferta* are the only trees. About 2 kilometres west of Karpenision a blind extension of the road from Lamia strikes a narrow gorge. The slopes before it are occasionally somewhat springy and we find, therefore, here as well as in the gorge, a richer and more luxuriant shrubby vegetation consisting of *Lonicera*, *Rhamnus*, *Rubus*, *Rosa*, *Acer*, *Prunus spinosa*, *Corylus*, *Juniperus Oxycedrus* and some *Quercus coccifera*. The margins of this gorge at about 1150 m. altitude are covered with a rather dense growth of Firs. The ascent of the Veluchi gave us the first glimpse into the formation of these Fir forests. From the mountain stretches southwestward a broad steeply descending ridge toward Karpenision, but southward it drops abruptly by vertical cliffs. At the foot of these cliffs an immense talus-cone has accumulated and extending into the Karpenisi valley which is several kilometres broad it blocks it up to 200 m. high like a gigantic bar. On this talus-cone the road, after having left the town, leads upward in easterly direction. The whole mass of rubble is covered entirely with *Juniperus Oxycedrus* which but rarely assumes here a tree-like character. Near the road which crosses the cone we notice a few large trees of *Pyrus amygdaliformis*. The herbaceous vegetation between the somewhat open growth of Juniper which also covers as pure stand above the growth mixed with *Carpinus duinensis* the lower part of the ridge mentioned above, is browsed and only meagre remnants left. The only other shrub associated with the Juniper is *Daphne oleoides*.

After leaving the rubble we ascend the wall exposed toward the south-east of the ridge mentioned before and reach at the same time the beginning of the Fir forest. On this steep limestone slope the trees are still rather scattered and interrupted by smaller or larger stretches of rubble on which interesting creeping plants grow. Here again the only shrub is *Juniperus Oxycedrus*. After having passed an alpine meadow densely covered with grass, the Fir forest on the somewhat less steep slopes begins to get denser; these stands are pure, without inter-mixture of any other tree and without any undergrowth of shrubs. From the margin some herbs penetrate into it for a short distance, but farther in only a few occasional Orchids occur, otherwise the forest floor is entirely bare. The individual trees which were fruiting well are mostly one-stemmed and rather slender, only occasionaly one sees gnarled and branched stems. In general the Firs of this forest are typical *Abies cephalonica*, i. e. the branches are glabrous, the leaves more or less pointed and placed all around the branch. We noticed, however, though we had during the ascent little time for a more careful investigation, scattered between the typical form a few trees which differed in their pubescent branchlets and somewhat more pectinately

arranged leaves. Forms apparently similar have been described by Maire and Petitmengin from mountains somewhat farther north as f. *pseudocilicica*.

At an altitude of 1800 m. the upper limit of the Fir forest is reached. The alpine region is not rich in ligneous species. Of locally restricted occurrence is an *Acantholimon* of globose habit which was beautifully in flower, much more common were *Daphne oleoides* and a spiny *Astragalus* and in addition *Juniperus* and *Rosa*. Everything was very much browsed almost to the summit. The rocky mass of the summit bears an interesting formation of cushion plants of various species and on the highest point at 2319 m. altitude a depressed shrub of *Juniperus* and one of *Rosa* barely manage to exist.

On July 26th we made an excursion to the well wooded mountains north of Karpenision to study Firs. Our way led us through the mill quarter up to the pass Hagios Athanasios (alt. 1470 m.) and then northwest toward Stenoma. The slopes above the mill quarter bear a shrub formation similar to that seen before near Karpenision, and only a few small trees of *Juniperus foetidissima* were new, a species not noticed elsewhere on this mountain. Then we entered a valley filled with rubble and lined with a dense growth of *Platanus orientalis* up to an altitude of 1150 to 1200 m. At a spring shaded by a beautiful *Elaeagnus* about 100 m. higher we leave this larger valley and enter a smaller one at the left. In the rubble of the brook there are some islands on which occasionally some Firs have taken root, but usually they are covered with a low scrub of two species of Roses, while the slopes above the brook are covered with Firs, but the trees near the road are much trimmed or felled entirely. At the end of the valley there are slopes of rock fragments which do not give the Firs the edaphic conditions for their growth but are covered with a rather dense shrubby vegetation consisting chiefly of *Juniperus Oxycedrus* and *Daphne oleoides*, also a spiny *Astragalus* is common while a second species is rarer.

After crossing the height the road to the pass is nearly level, and younger and older Firs become more plentiful. On examination of numerous individual trees we found that these Firs presented a surprising variation, though they appeared quite uniform in habit. The majority of the trees are typical *Abies cephalonica* with glabrous branchlets and pointed spiny radially spreading leaves, but besides these there are many with either sparingly or densely pubescent branchlets and leaves like typical *A. cephalonica*. The greatest deviation, however, is shown by the individuals that have the pubescence of the second kind, but much less pointed or even quite obtuse leaves and in the latter case not radially spreading but more or less pectinate. By these characters such forms show a certain resemblance with *Abies alba*, though they never present the characters of that species in their typical development, the leaves never showing the slightest indication of an emargination at the apex. This polymorphy arising from various combinations of different characters gives decidedly

the impression that we have here a population of hybrids. It is, however, difficult to answer the question regarding the parents. One of the parents must certainly be *A. cephalonica* which is present in great numbers; while *A. alba* according to the characters and also its geographical distribution should be the one to be taken into consideration as the second parent, but this species is lacking in this region. If we have here really a case of hybridization, it must have occurred at an earlier period. This question deserves a special study.

On the north side of the pass Hagios Athanasios the slopes drop abruptly into a deep valley but yet afford a foot-hold for the growth of Firs. The Fir forest in this gorge is perhaps the tallest and densest I saw in Greece. But in spite of its density the forest allows a free view between the stems, since there is no shrubby undergrowth and the stems are to a great height free of branches. This certainly cannot be exclusively traced to the influence of man, but is a peculiarity of many species of *Abies*, though not of *A. cephalonica*. Also the herbaceous undergrowth is very sparse and chiefly restricted to the roadside. This year's seedlings were plentiful, while older seedlings could not be found. Perhaps they cannot grow in the dense shade of the forest, as is the case with some Mediterranean Firs in contrast to *A. alba*. But more of the seedlings are certainly destroyed by the sheep which are daily driven through the forest at this season. We could, moreover, observe that trees of the true *A. cephalonica* here as on the Veluchi bore cones profusely, while on the other forms we could find no cones, though I looked eagerly for them to be able to compare the shape of the cone-scales.

Farther down toward Stenoma all the not too steep slopes and all the ridges are covered with a similar Fir forest which is often interrupted by very steep rubble slopes which again alternate with steep cliffs. Flysch[1] and limestone replace each other in turn. The very loose rubble slopes are only sparingly grown over with creeping plants, but where the rubble has settled down, deciduous trees, chiefly *Fraxinus* and *Carpinus duinensis* are found. These species often form with *Coronilla emeroides* a sparser or denser scrub in the crevices or on the ledges of the rocks. But all the branches which might be reached have been browsed by the goats and sheep. In more open places *Fraxinus Ornus* frequently enters the Fir forest. It was surprising to see *Quercus coccifera*, which we left during the ascent long before we reached the pass, appear at 1300–1350 m. altitude, but only as a meagre low bush in the Fir forest, a sign of its almost unbelievable tenacity. The road follows quickly descending, now on the right now on the left side, the broad ridge at whose foot Stenoma is situated, and the Fir forest becomes denser and barer. The whole valley of Stenoma

[1] Flysch, a geological formation composed mainly of sandstones, soft marls and sandy shales and most typically represented in southeastern Europe, extending from southwestern Switzerland to the Vienna basin and along the northern flank of the Carpathians to the Balkan peninsula; it is also found in the Pyrenees, the Apennines and the Caucasus and extends into Asia.—Ed.

is a large continuous Fir forest. In some ravines grows according to Heldreich *Aesculus Hippocastanum* spontaneously, but we looked in vain for this interesting tree and also the shepherds there could not give any definite information; one only said that he had heard about it, but without knowing the locality, for he had not seen the tree itself, and it remained after all uncertain whether he meant the right tree and not *Castanea sativa*. To try once more to find the Horse-chestnut we wandered one day to Megalochorio at the foot of the Kaliakuda whose imposing summit had attracted us for some time. The road follows during its whole length the Karpenisi River which changes from an east to west direction soon with a sharp bend into a north to south direction. The fall of the river is only slight. The bare only slightly grassy slopes below the town were soon succeeded by a rather luxuriant growth of deciduous shrubs which occupied chiefly in the shape of often very broad hedges the unused stretches between the corn-fields and also the margins of the rubble beds of the inflowing brooklets and the waterless ravines. Two deciduous Oaks, *Quercus conferta* and *Q. lanuginosa*, which occasionally become tree-like, take a prominent part in the composition of this growth, but there also appear in great numbers *Crataegus* sp. (*C. monogyna* var.?), *Cornus mas*, *Rubus* sp., *Rosa* sp., *Cydonia vulgaris*, *Prunus spinosa* which seems here as elsewhere on the Balkan very polymorphous, *Pyrus* sp., *Viburnum*, *Acer monspessulanum* and less common *Quercus coccifera* and *Juniperus Oxycedrus* which together or separately cover the drier slopes above with a sparse phrygana formation and occasionally become tree-like. The *Viburnum* is in higher situations rather rare, but is found more frequently on the river banks between Willows which here dominate, the only other associated species being *Platanus orientalis*, usually as a tree, but frequently shrubby. On the left side of the valley which we now follow we found the Fir forest reaching down to the bottom of the valley, but naturally at its lower limit, as we have observed in other places, it is open and often interrupted, partly on account of cutting and partly also in consequence of unfavorable edaphic conditions. Therefore elements of the maquis formation and of the Oak region can invade it and become established. Thus we find, particularly near Klapsi (Klapsion, Klavsion), much *Quercus conferta*, *Q. lanuginosa* and tree-like *Q. coccifera* between the Firs; sometimes the last named Oak predominates. The prevailing shrub is *Phillyrea media*. From Klapsi to Megalochorio *Quercus coccifera* forms, either alone or mixed with *Phillyrea* a low, monotonous and very much browsed phrygana formation whose cheerless appearance was enhanced and aggravated by the mercilessly burning mid-day sun, but immediately before the village we were unexpectedly embraced by the welcome shade of a small, probably planted grove consisting of tall trees of *Quercus coccifera*, *Q. conferta* and *Q. lanuginosa*, *Ulmus campestris* and *Juglans regia*, but water we did not find until we reached the village.

(To be continued)

AN ENUMERATION OF THE LIGNEOUS PLANTS OF ANHWEI[1]

ALFRED REHDER AND ERNEST H. WILSON.

RUTACEAE

Determined by ALFRED REHDER

Zanthoxylum setosum Hemsley in Jour. Linn. Soc. XXIII. 107 (1886). Chu hwa shan, *R. C. Ching*, no. 2668, Herb. Univ. Nanking no. 7596, May 2, 1925 (shrub 5 m. tall).

Zanthoxylum alatum Roxburgh var. **planispinum** Rehder & Wilson in Sargent, Pl. Wilson. II. 125 (1916).

Zanthoxylum planispinum Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 138 (Fl. Jap. Fam. Nat. I. 30) (1846).

Chuchow, Herb. Univ. Nanking no. 1298, May 4, 1920.

Zanthoxylum schinifolium Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 137 (Fl. Jap. Fam. Nat. I. 29) (1846).—Shirasawa, Icon. Ess. For. Jap. II. t. 33, fig. 1–15 (1908).

Fagara schinifolia Engler in Engler & Prantl, Nat. Pflanzenfam. III. abt. IV. 117 (1896).

Chin yung hsien, foot of mountain, *K. Ling*, no. 1123, Herb. Univ. Nanking no. 9616, August 6, 1924 (shrub 1 m. tall); Li shan, northwest Chemen, alt. 200 m., *R. C. Ching*, no. 3107, August 3, 1925 (shrub 4 m. tall).

Zanthoxylum molle, Rehder, sp. nov. (§ Fagara).

Arbor 4–10-metralis; cortex cinereus, aculeatus (fide R. C. Ching); ramuli crassi, initio tomentelli, mox glabrescentes, in sicco purpureo-fusci, aculeis crassis conicis vel leviter compressis rectis rarius leviter curvatis 1–2 mm. longis armati. Folia deciduа, pinnata, 30–40 cm. longi petiolo 10–12 cm. longo et ut rhachis initio villosulo demum glabrescente purpurascente incluso; foliola 7–9 vel interdum in folio sub inflorescentia ad 3 reducta, lateralia brevissime petiolulata vel petiolis inferioribus ad 3 mm. longis, terminale petiolo 2–3 cm. longo suffultum, ovata vel ovato-oblonga, 8–14 cm. longa et 3.5–6.5 vel fere 7 cm. lata, subito acuminata, basi rotundata vel latissime cuneata, margine leviter revoluta glandulis conspicuis notata non vel vix crenulata, supra glabra costa impressa villosula excepta, nitidula, glanduloso-punctulata, subtus dense molliter lanuginoso-villosa, crassiuscula, nervis lateralibus 12–18 supra impressis subtus prominulis. Inflorescentia terminalis, breviter pedunculata, corymboso-paniculata, breviter flavescenti-villosula, axibus ultimis hirsuto-villosis, inermis vel axi primaria sparse aculeolata, masculа circiter 20 cm. alta et 25–30 cm. lata, feminea minor; flores pentameri, subsessiles, masculi in axibus 5ti-7mi, feminei 4ti-6ti ordinis, basi bracteis 3 late ovatis sepala vix aequantibus ciliolatis extus sparse pilosis suffulti; sepala late ovata, 0.75 mm. longa, obtusiuscula, fere glabra vel ciliolata et extus basin versus sparse pilosa; petala oblonga, concava, 2.5 mm. longa, obtusa, albida; flores masculi staminibus 5, filamentis subulatis

[1] Continued from p. 129.

3 mm. longis petala paullo superantibus, antheris orbiculari-ovatis, pistillo abortivo tripartito petala dimidia fere aequante; flores feminei ovario subgloboso e carpellis 3 basi et apice connatis ceterum liberis composito petala fere aequante, stylo brevissimo, stigmate magno peltato apicem ovarii fere tegente. Fructus desiderantur.

ANHWEI: west Chemen, alt. 230 m., in wood near stream, *R. C. Ching*, no. 3182, August 8, 1925 (tree 10 m. tall, trunk 20 cm. diam.; pistillate flowers; type).

HUPEH: Patung, ravines, *E. H. Wilson*, Veitch Exped. no. 2487, July, 1901 (tree 4–7 m. tall; staminate flowers).

This new species is easily distinguished from all other Chinese species by the large leaflets densely soft-pubescent beneath; it seems most nearly related to *Z. giganteum*[1] and to *Z. ailanthoides* Sieb. & Zucc. which both are quite glabrous. With the former it agrees in the number and shape of leaflets which are even somewhat larger and more lustrous in *Z. giganteum*, while the latter has small, narrower and more numerous leaflets.

Evodia glauca Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 23 (1867); Prol. Fl. Jap. 211 (1867).

Evodia meliaefolia Shirasawa, Icon. Ess. For. Jap. II. t. 34 fig. 1–9 (1908).—Non Bentham.

Si liu, Chemen, alt. 250 m., *R. C. Ching*, no. 3098, August 3, 1925 (tree 10 m. tall).

Evodia officinalis Dode in Bull. Soc. Bot. France, LV. 703 (1908).—Rehder & Wilson in Sargent, Pl. Wilson. II. 130 (1914).

Wang shan, *K. Ling*, no. 1152, Herb. Univ. Nanking no. 7732, August 9, 1924; Wang shan, Wu yung, alt. 1000 m., *K. Ling*, no. 1296, Herb. Univ. Nanking no. 9623, August 21, 1924; Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2773, June 26, 1925 (tree 14 m. tall).

Skimmia melanocarpa Rehder & Wilson in Sargent, Pl. Wilson. II. 138 (1914).

Chu hwa shan, *R. C. Ching*, no. 2625, Herb. Univ. Nanking no. 7552, April 29, 1925, (shrub 1 m. tall); Wang shan, alt. 750 m., *R. C. Ching*, no. 2947, July 12, 1925 (shrub 1 m. tall; immature fruit).

Without fruit the identification of the specimens remains doubtful; the flowers of no. 2625 are perfect, while in *S. melanocarpa* and *S. japonica* Thunb. they are usually dioecious.

Fortunella Hindsii Swingle in Jour. Washington Acad. Sci. V. 175, fig. 5 (1915).

Atalantia Hindsii Oliver apud Bentham, Fl. Hongk. 51 (1861).

Wu yuan City, alt. 140 m., *R. C. Ching*, no. 3280, August 25, 1925.

Citrus Aurantium Linnaeus, Sp. 782 (1753).

[1] **Zanthoxylum giganteum** Rehder, comb. nov.

Fagara gigantea Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 10, p. 2 (Anzeig. Akad. Wiss. Wien, 1921, p. 64) (1921).

Liche, near Tunki, cultivated, alt. 120 m., *R. C. Ching*, no. 3344, September 28, 1925 (tree 30 m. tall).

Without fruit the identification of this plant is somewhat doubtful.

Poncirus trifoliata Rafinesque, Sylva Tell. 143 (1838).—Swingle in Sargent, Pl. Wilson. II. 149 (1914).

Citrus trifoliata Linnaeus, Sp. ed. 2, p. 1101 (1763).—Hooker f. in Bot. Mag. CVI. t. 5513 (1880).

West Chemen, alt. 100 m., very rare, possibly cultivated, *R. C. Ching*, no. 3194, August 9, 1925 (shrub 10 m. high).

SIMARUBACEAE

Determined by ALFRED REHDER

Picrasma quassioides Bennett, Pl. Jav. Rar. 198 (1844).

Picrasma ailanthoides Planchon in Lond. Jour. Bot. v. 573 (1846).—Shirasawa, Icon. Ess. For. Jap. I. 90, t. 53 (1900).

Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no. 2308, June, 14, 1922; without precise locality, *R. C. Ching*, no. 2518, in 1925.

Ailanthus altissima Swingle in Jour. Washington Acad. Sci. VI. 495 (1916).

Ailanthus glandulosa Desfontaines in Mém. Acad. Sci. Paris, 1786, p. 265, t. 8.

South Chemen, alt. 250 m., *R. C. Ching*, no. 3206, August 13, 1925.

MELIACEAE

Determined by ALFRED REHDER

Melia Azedarach Linnaeus, Sp. 384 (1753).—Sims in Bot. Mag. XXVII. t. 1066 (1808).—Rehder & Wilson in Sargent, Pl. Wilson. II. 157 (1914), where synonymy and literature is cited.

Melia japonica G. Don, Gen. Syst. I. 680 (1831).—Shirasawa, Icon. Ess. For. Jap. II. t. 34, fig. 14-26 (1908).

West Chemen, alt. 100 m., *R. C. Ching*, no. 3189, August 9, 1925 (tree 12 m. tall).

POLYGALACEAE

Determined by ALFRED REHDER

Polygala arillata Hamilton apud D. Don, Prodr. Fl. Nepal. 199 (1824).—Wallich, Pl. As. Rar. I. t. 100 (1830).—Chodat in Mém. Soc. Phys. Genève, Suppl. no. VIII. 94, t. 17, fig. 12–14 (Monog. Polygal.) (1891).

Wang shan, alt. 580 m., *R. C. Ching*, no. 2933, July 11, 1925; Wang shan, back of Lion Ridge, alt. 1300 m., *R. C. Ching*, no. 2976, July 12, 1925.

EUPHORBIACEAE

Determined by ALFRED REHDER

Securinega ramiflora Müller Arg. in De Candolle, Prodr. XV. pt. II. 449 (1866).—Rehder in Jour. Arnold Arb. VII. 191 (1926).

Securinega fluggeoides Müller Arg. in De Candolle, Prodr. XV. pt. II. 450 (1866).

Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no.

2304, June 14, 1922; Shih tai hsien, alt. 300 m., *A. N. Steward*, no. 1244, Herb. Univ. Nanking no. 5484, August 7, 1924.

I am unable to find sufficient differences between *S. ramiflora* Müll.-Arg. and *S. flüggeoides* Müll.-Arg. to treat them as distinct species, though there are differences in habit, color of branches and shape and texture of leaves which may be used for the distinction of geographical varieties. Also Dr. Pax agrees (in litt. 14. VI. 1927) that the two are scarcely specifically different.

Phyllanthus flexuosus Müller Arg. in De Candolle, Prodr. XV. pt. II. 324 (1866).

Wang shan, *K. Ling*, no. 1234, Herb. Univ. Nanking no. 7788, August 12, 1924; Wang shan, below Sz tz ling, alt. 1600 m., *A. N. Steward*, no. 1320, Herb. Univ. Nanking no. 7191, August 12, 1924 (shrub 3 m. tall).

Phyllanthus glaucus Wallich, Cat. 7927 A (1832), nomen.—Müller Arg. in Linnaea, XXXII. 14 (1863).

Phyllanthus flüggeiformis Müller Arg. in De Candolle, Prodr. XV. pt. II. 349 (1866).

Chu hwa shan, alt. 600 m., *R. C. Ching*, nos. 2688 (Herb. Univ. Nanking no. 7616) and 2771, May 2 and June 26, 1925 (shrub 6-8 m. tall).

Glochidion puberum Hutchinson in Sargent, Pl. Wilson. II. 518 (1916).

Agyneia pubera Linnaeus, Mant. II. 296 (1771).

Glochidion obscurum Hemsley in Jour. Linn. Soc. XXVI. 425 (1894).—Non Blume.

Without precise locality, *R. C. Ching*, no. 2734, in 1925.

Daphniphyllum macropodum Miquel in Ann. Mus. Bot. Ludg.-Bat. III. 129 (1867).—Rosenthal in Engler, Pflanzenr. IV.-147[a], p. 9, fig. 1 (1919).

Wang shan, *N. K. Ip*, Herb. Univ. Nanking no. 4767, August 28, 1923; same locality, alt. 1200 m., *R. C. Ching*, no. 2982, July 12, 1925 (shrub 7 m. tall); Wang shan, below Wen chi yuen, alt. 1700 m., *A. N. Steward* no. 1299, Herb. Univ. Nanking no. 7170, August 11, 1924 (shrub 3 m. tall); Chang gon shan, Wu yuan, alt. 800 m., *R. C. Ching*, no. 3221, August 16, 1925 (tree 9 m. tall).

Discocleidion glabrum Merrill in Jour. Arnold Arb. VIII. 8 (1927).

Wu yuan, *K. Ling*, no. 7866, August 24, 1924 (shrub near streams).

Mallotus tenuifolius Pax in Bot. Jahrb. XXIX. 429 (1900).

Mallotus apelta Müll. Arg. var. *β tenuifolius* Pax in Engler, Pflanzenr. IV.-147, VII. 171 (1914).

Wang shan, mountain slope, *K. Ling*, no. 1231, Herb. Univ. Nanking no. 9618, August 12, 1924 (tree); Chu hwa shan, *R. C. Ching*, no. 2772, June 27, 1925 (tree 8 m. tall).

Mallotus apelta Müller Arg. in Linnaea, XXXIV. 189 (1865); in De Candolle, Prodr. XV. pt. II. 963 (1866).

Wang shan, alt. 1100 m., *A. N. Steward*, no. 1332, Herb. Univ. Nan-

king no. 7203, August 12, 1924 (shrub 2 m. tall); same locality, *K. Ling*, no. 1230, Herb. Univ. Nanking no. 9617, August 12, 1924; Tiger Ridge, Yeh hsien, *R. C. Ching*, no. 3090, July 27, 1925, (shrub 5 m. tall).

Mallotus repandus Müller Arg. in Linnaea, XXXIV. 197 (1865); in De Candolle, Prodr. XV. pt. II. 981 (1866).

Shi teh hsien, *K. Ling*, no. 1131, Herb. Univ. Nanking no. 7720, August 7, 1924; Yeh hsien, alt. 300 m., *R. C. Ching*, no. 3086, July 27, 1925 (tree 30 m. tall).

Mallotus philippinensis Müller Arg. in Linnaea XXXIV. pt. II. 196 (1865); in De Candolle, Prodr. XV. pt. II. 980 (1866).—Meyer & K. Schumann, Atl. Offiz. Pflanz. II. 104, t. 88 (1896).—Hayata in Jour. Coll. Sci. Tokyo, XX. art. III. 43, t. 3, fig. II (1904).

Wu yuan, *K. Ling*, no. 1339, Herb. Univ. Nanking no. 7874, August 25, 1924; Chemen, alt. 225 m., *R. C. Ching*, no. 3138, August 5, 1925 (shrub 5 m. tall).

Aleurites Fordii Hemsley in Hooker's Icon. XXIX. t. 2801, 2802 (1906). —Pax in Engler, Pflanzenr. IV.-147, i. 132 (1910).—Wilson in Bull. Imp. Inst. XI. 447, t. 9–12, 13, fig. 2 (1913).—Chun, Chin. Econ. Trees, 208, t. 75 (1923).

Chu hwa shan, *R. C. Ching*, no. 2713, Herb. Univ. Nanking no. 7581, May 1, 1925 (tree 6 m. tall); Wu yuan, alt. 150 m., *R. C. Ching*, no. 3275, August 22, 1925 (tree 10 m. tall).

Sapium sebiferum Roxburgh, Fl. Ind. ed. 2, III. 693 (1832).—Pax in Engler, Pflanzenr. IV.–147, V. 237 (1912).—Chun, Chin. Econ. Trees, 212, t. 76 (1923).

Liu chu wan, alt. 30–250 m., *R. C. Ching*, no. 2737, June 25, 1925.

Sapium japonicum Pax & K. Hoffmann in Engler, Pflanzenr. IV. 147, V. 252 (1912).

Excoecaria japonica Müller Arg. in Linnaea, XXXII. 123 (1863); in De Candolle, Prodr. XV. pt. II. 1217 (1866). Shirasawa, Icon. Ess. For. Jap. II. t. 36, fig. 1–13 (1908).

Wang shan, *K. Ling*, no. 1148, Herb. Univ. Nanking no. 7729, August 9, 1924; same locality, alt. 1000 m., *N. K. Ip*, no. 8, Herb. Univ. Nanking no. 7650, August 11, 1924 (tree 7 m. tall); same locality, alt. 1200 m., *R. C. Ching*, no. 3019, July 15, 1925 (shrub 6 m. tall); Wang si che, south Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2846, June 29 1925; Kau toun, Tai ping hsien, alt. 200 m., *R. C. Ching*, no. 2882, July 3, 1925 (low shrub).

BUXACEAE

Determined by ALFRED REHDER

Buxus microphylla Siebold & Zuccarini var. **sinica** Rehder & Wilson in Sargent, Pl. Wilson. II. 165 (1914).

Wang shan, alt. 550 and 900 m., *R. C. Ching*, nos. 2943 and 3000, July 11 and 13, 1925 (slender shrub 3 m. tall).

ANACARDIACEAE

Determined by ALFRED REHDER

Pistacia chinensis Bunge in Mém. Sav. Étr. Acad. Sci. St. Pétersb. II. 89 (Enum. Pl. Chin. Bor. 15) (1833).—Engler in De Candolle, Monog. Phaner. IV. 291 (1883).—Bean in Kew Bull. Misc. Inform. XXIII. 393, t. (1910) (habit).

Chuchow, Herb. Univ. Nanking no. 1696, April, 13, 1921; Chu hwa shan, *R. C. Ching*, no. 2712, Herb. Univ. Nanking no. 7609, May 5, 1925 (tree 20 m. tall).

Rhus javanica Linnaeus, Sp. 265 (1753); ed. 2, 380 (1762).—Rehder & Wilson in Sargent, Pl. Wilson. II. 178 (1914).

Rhus semialata β Osbeckii De Candolle, Prodr. II. 67 (1825.)—Shirasawa, Icon. Ess. For. Jap. I. 96, t. 58, fig. 18–34 (1900.)

Chang gon shan, alt. 750 m., *R. C. Ching*, no. 3239, August 17, 1925 (tree 10 m. tall).

Rhus trichocarpa Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 84 (1866); Prol. Fl. Jap. 16 (1866).—Sargent in Gard. & Forest, X. 384, fig. 49 (1897).

Wang shan, alt. 1800 m., *K. Ling*, no. 1173, Herb. Univ. Nanking no. 7746, August 11, 1924; Tien tai shan, Chu hwa shan, alt. 1150 m. *R. C. Ching*, no. 2825, June 28, 1925 (shrub 2–3 m. tall); Chang gon shan, Wu Yuan, alt. 1150 m., *R. C. Ching*, no. 3235, August 17, 1925 (shrub 6–7 m. tall).

Rhus verniciflua Stokes, Bot. Mat. Med. II. 164 (1812).—Rehder & Wilson in Sargent, Pl. Wilson. II. 181 (1914).—Chun, Chin. Econ. Trees, 219, t. 79 (1923).

Rhus vernicifera De Candolle, Prodr. II. 68 (1825), exclud. specim. nepal.—Shirasawa, Icon. Ess. For. Jap. I. 94, t. 57, fig. 17–30 (1900)—De Wildeman, Icon. Hort. Thenens. VI. 1, t. 201 (1906).

Ching yang hsien, alt. 200 m., *A. N. Steward*, no. 1237, Herb. Univ. Nanking no. 5477, August 5, 1924 (shrub 5 m. tall); Chu hwa shan, alt. 580 m., *R. C. Ching*, no. 2775, June 27, 1925 (tree 8 m. tall).

The specimens cited above, and particularly Steward's specimen, differ from typical *R. verniciflua* in their more copious pubescence; the branchlets, inflorescence and petioles are rather densely pilose with fulvous hairs, the leaflets are pilose on the veins and veinlets and slightly on the face beneath and furnished with scattered short hairs above. The only other specimens in the herbarium of this Arboretum with similar pubescence is a specimen collected by A. N. Steward near Hang chow (Herb. Univ. Nanking no. 2360) and R. Mell's no. 15 from northern Kwangtung.

Rhus succedanea Linnaeus, Mant. 221 (1781).—Shirasawa, Icon. Ess. For. Jap. I. 95, t. 57, fig. 1–16 (1900).

Wang shan, alt. 1150 m., *R. C. Ching*, no. 3022, July 15, 1925 (tree 10 m. tall).

AQUIFOLIACEAE

Determined by ALFRED REHDER

Ilex rotunda Thunberg, Fl. Jap. 77 (1784).—Shirasawa, Icon. Ess. For. Jap. t. 100, t. 60, fig. 1–17 (1900).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 106 (Monog. Aquifol.) (1901).

Kimen, *N. K. Ip*, no. 42, Herb. Univ. Nanking no. 7667, August 19, 1924 (shrub 7 m. tall); Wang shan, alt. 500 m., *R. C. Ching*, no. 2914, July 5, 1925 (tree 10 m. tall); Li kan, west Chemen, alt. 100 m., *R. C. Ching*, no. 3157, August 7, 1925 (shrub 6 m. tall); south Simin, alt. 250 m., *R. C. Ching*, no. 3329, September 7, 1925 (tree 6 m. tall).

Ilex pedunculosa Miq. f. *β* **continentalis** Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 110 (Monog. Aquifol.) (1901).

Wang shan, *K. Ling*, no. 1191, Herb. Univ. Nanking no. 7755, August 11, 1924 (tree 6 m. tall); same locality, above Tze kuan tze, alt. 1450 m., *A. N. Steward*, no. 1286, Herb. Univ. Nanking no. 7158, August 11, 1924 (shrub 4 m. tall); same locality, alt. 1500 m., *R. C. Ching*, no. 3017, July 15, 1925 (shrub 6 m. tall); Tien tai shan, Chu hwa shan, alt. 1150 m., *R. C. Ching*, no. 2816, June 28, 1925 (tree or shrub 7 m. tall).

The Chinese form differs from the Japanese type which is well figured by Shirasawa (Icon. Ess. For. Jap. t. 100, t. 61, fig. 1–10, 1900) only in the larger leaves and more strongly ciliolate calyx-lobes.

Ilex purpurea Hasskarl, Cat. Pl. Hort. Bogor. 230 (1844).

Ilex Oldhami Miquel in Ann. Mus. Bot. Lugd. Bat. III. 105 (1867).—Hemsley in Jour. Linn. Soc. XXIII. 117 (1886).

Ilex purpurea var. *α Oldhamii* (Miquel) Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 112, t. 3, fig. 2 (Monog. Aquifol.) (1901).

North foot of Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2758, June 26, 1925 (tree 14 m. tall); Chemen, alt. 250 m., *R. C. Ching*, no. 3122, August 8, 1925 (tree 12 m. tall); without precise locality, *P. Heude*, about 1874 (ex Hemsley, l. c.).

Ilex Hanceana Maxim. var. **anhweiensis** Loesener, var. nov.

A typo recedit ramulis longius hirtellis. TH. LOESENER.

Li shan, northwest Chemen, alt. 175 m., *R. C. Ching*, no. 3109, August 3, 1925 (slender shrub 2.5 m. tall).

This new variety differs from the type in its more conspicuous pubescence; the branchlets remain densely short-pilose up to the fourth year; the leaves are obovate or oval to oblong, distinctly emarginate at the apex and of thinner texture than specimens of the typical form from Hongkong; the young fruits are solitary and subsessile.

Ilex Pernyi Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 221 (Pl. David. I. 69) (1883). Oliver in Hooker's Icon. XVI. t. 1539 (1886).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 278 (1901).

Chang gon shan, Wu yuan, alt. 750 m., *R. C. Ching*, no. 3246, August 17, 1925 (shrub 4 m. tall).

Ilex cornuta Lindley & Paxton, Flow. Gard. I. 43, fig. 27 (1850).—

Hooker in Bot. Mag. LXXXIV. t. 5059 (1858).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 278 (1901).

Chu hwa shan, *R. C. Ching*, no. 2719, Herb. Univ. Nanking no. 7524, May 3, 1925 (tree 11 m. tall); Liu chu wan, alt. 250 m., *R. C. Ching*, no. 2736, June 25, 1925 (tree 7 m. tall).

Ilex latifolia Thunberg, Fl. Jap. 79 (1784).—Shirasawa, Icon. Ess. For. Jap. I. 102, t. 62, fig. 17–32 (1900).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 289 (1901).

Wang shan, above Mao pung, alt. 1200 m., *A. N. Steward*, no. 1268, Herb. Univ. Nanking no. 7140, August 9, 1924; Chu hwa shan, alt. 800 m., *K. Ling*, no. 2053, Herb. Univ. Nanking no. 7295, April 25, 1924 (tree 16 m. tall); same locality, *R. C. Ching*, no. 2626, Herb. Univ. Nanking no. 7554, April 29, 1925 (tree 20 m. tall, trunk 60 cm. diam.); Li Kan, Chemen, alt. 100 m., *R. C. Ching*, no. 3155, August 7, 1925 (tree 15 m. tall, trunk 55 cm. diam.).

Ilex ficoidea Hemsley in Jour. Linn. Soc. XXIII. 116 (1886).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 328 (1901).

Tan chuan, Wu yuan, *K. Ling*, no. 1320, Herb. Univ. Nanking no. 7858, August 24, 1924 (tree 10 m. tall).

Ilex triflora Bl. var. **viridis** Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 345 (1901).

Ilex viridis Champion in Hooker Jour. Bot. & Kew Gard. Misc. IV. 329 (1852).

Wang shan, alt. 1130 m., *R. C. Ching*, no. 3025, July 15, 1925 (shrub 6 m. tall).

Ilex memecylifolia Champion in Hooker Jour. Bot. & Kew Gard. Misc. IV. 328 (1852).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 350 (1901).

Wu yuan, alt. 550 m., *R. C. Ching*, no. 3307, September 4, 1925 (shrub 5 m. tall).

Ilex Wilsonii Loesener in Nov. Act. Leop-Carol. LXXIX. 287 (Monog. Aquifol. II) (1908).

Wang shan, alt. 1600 m., *N. K. Ip*, Herb. Univ. Nanking no. 4793, August 28, 1923; same locality, *K. Ling*, no. 1176, Herb. Univ. Nanking no. 7749, August 11, 1924 (tree 6 m. tall); Wang shan, on the way to Lion ridge, alt. 900 m., *R. C. Ching*, no. 2974, July 12, 1925 (shrub 3 m. tall).

Here belong also Ching's numbers 1624, 1746, 1748 and 2494 from Chekiang. For the determination of this Ilex I am indebted to Dr. Loesener to whom I had sent material of Ching's numbers 1624, 1746 and 2974.

Ilex pubescens Hooker & Arnott, Bot. Voy. Beechey, 176, t. 35 (1841).—Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 356 (1901).

Wu yuan, *K. Ling*, no. 1326, Herb. Univ. Nanking no. 7863, August 24, 1924.

Ilex dubia Trel. var. **pseudomacropoda** Loesener in Sargent, Pl. Wilson. I. 82 (1911).

Wang shan, *K. Ling*, no. 1211, Herb. Univ. Nanking no. 7772, August 12, 1924; same locality, alt. 1300–1375 m., *R. C. Ching*, nos. 3020; 3048, July 15 and 17, 1927 (tree 10–12 m. tall); Chang gon shan, Wu yuan, alt. 750 m., *R. C. Ching*, no. 3241, August 17, 1925, (tree 10 m. tall).

Ilex macrocarpa Oliver in Hooker's Icon. XVIII. t. 1787 (1888). —Loesener in Nov. Act. Acad. Leop.-Carol. LXXVIII. 489 (1901).

Sixty li north of Chu hwa shan, *R. C. Ching*, no. 2722, May 3, 1925; on the way to Chu hwa shan, alt. 165 m., *R. C. Ching*, no. 2750, June 25, 1925 (tree 15 m. tall); without precise locality, *R. C. Ching*, no. 2732, in 1925 (flowers).

CELASTRACEAE

Determined by ALFRED REHDER

Evonymus alata Regel, Tent. Fl. Ussur. 40, t. 7, fig. 124 (1861).—Shirasawa, Icon. Ess. For. Jap. I. 104, t. 63 (1900).

Evonymus Thunbergiana Blume, Bijdr. Fl. Ned. Ind. 1147 (1825).—Hemsley in Jour. Linn. Soc. XXIII. 121 (1886).

Chuchow, *L. F. Tsu*, Herb. Univ. Nanking no. 513, May 4, 1920; Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no. 2328, June 15, 1922; Wang shan, *N. K. Ip*, Herb. Univ. Nanking no. 5123, August 28, 1923; Chu hwa shan, *R. C. Ching*, no. 2677, Herb. Univ. Nanking no. 7605, May 2, 1925 (shrub 6 m. tall); Tien tai shan, Chu hwa shan, alt. 1150 m., *R. C. Ching* no. 2822, June 28, 1925 (shrub 25 m. tall); Wang si che, Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2876, June 30, 1925 (shrub 3 m. tall).

All the specimens cited above except the first have the branches destitute of corky wings and therefore represent the form distinguished as var. *aptera* Reg. (*E. subtriflora* Bl.).

Evonymus euscaphis Hand.-Mazz. var. **gracilipes** Rehder, var. nov.

A typo recedit foliis angustioribus et longioribus 5–11.5 cm. longis et 8–16 mm. latis, pedunculis 2–3 et pedicellis 1–1.5 cm. longis filiformibus pendentibus.

Chang gon shan, Wu yuan, alt. 850 m., *R. C. Ching*, no. 3249, August 17, 1925 (shrub 1 m. tall).

This new variety agrees well with Handel-Mazzetti's no. 11031, the type of *E. euscaphis*, in its fruit which resembles that of *E. alata*, but it differs in the longer and narrower leaves and the slenderer and longer pedunces and pedicels. In the shape of its leaves and in the slender pedunces and pedicels it resembles according to the description very much *E. amygdalifolia* Franch. of which the fruit is unknown, but leaves of the latter are described as "tenuiter papyracea," 4–8 cm. long and 1–2 cm. broad, and the petioles as 5–10 mm. long, while in our plant the leaves are coriaceous and at least partly persistent, longer and narrower and the petioles are 3–6 mm. long.

Evonymus acanthocarpa Franch. var. **sutchuenensis** Franchet apud Loesener in Bot. Jahrb. xxix. 439 (1900).

Without precise locality, *R. C. Ching*, in 1925.

This specimen was numbered 3028 apparently by mistake as this number belongs to another plant.

Evonymus Maackii Ruprecht in Bull. Phys.-Máth. Acad. Sci. St. Pétersb. xv. 358 (1857).

Wang shan, alt. 1800 m., *K. Ling*, no. 1171, Herb. Univ. Nanking no. 7744, August 11, 1924; Chu hwa shan, *R. C. Ching*, no. 2680, Herb. Univ. Nanking no. 7608, May 2, 1925 (tree 10 m. tall).

Evonymus Bungeana Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. ix. 470 (Ind. Fl. Pekin.) (1859); in Mél. Biol. ix. 188 (1881); in Bull. Acad. Sci. St. Pétersb. xxvii. 448 (1882).—Rehder in Sargent, Trees & Shrubs i. 125, t. 63 (1903).—Prain in Bot. Mag. cxliii. t. 8656 (1916).

Wang shan, alt. 300–900 m., *N. K. Ip*, Herb. Univ. Nanking no. 5136, August 28, 1923; 30 li south of Tatung, alt. 100 m., *R. C. Ching*, no. 2743, June 25, 1925 (tree 10 m. tall).

Evonymus oxyphylla Miquel in Ann. Mus. Bot. Lugd.-Bat. ii. 86 (1865–1866).—Shirasawa, Icon. Ess. For. Jap. i. 104, t. 64, fig. 1–10 (1900).—Prain in Bot. Mag. cxli. t. 8639 (1915).

Wang shan, alt. 11–1500 m., *N. K. Ip*, no. 17, Herb. Univ. Nanking no. 7651, August 11, 1924 (tree 6–7 m. tall); same locality, *K. Ling*, nos. 1168 and 1186, Herb. Univ. Nanking nos. 7743 and 7752, August 11, 1924 (tree 4 m. tall); *R. C. Ching*, no. 2989, July 13, 1925 (slender shrub 5 m. tall); west Wu yuan, alt. 900 m., *R. C. Ching*, no. 3251, August 17, 1925 (shrub or small tree 8 m. tall).

Evonymus grandiflora Wallich in Roxburgh, Fl. Ind. ed. Carey, II. 404 (1824); Tent. Fl. Nepal. 41, t. 30 (1824); Pl. As. Rar. iii. 35, t. 254 (1832).—Loesener in Bot. Jahrb. xxx. 452 (1902).

Kimen hsien, top of mountain, alt. 550 m., *K. Ling*, no. 1266, Herb. Univ. Nanking no. 7810, August 18, 1924 (tree 7 m. tall); Shu ling hsien, *K. Ling*, no. 1293, Herb. Univ. Nanking no. 7834, August 21, 1924; Wang shan, foot of mountain, *K. Ling*, no. 1135, Herb. Univ. Nanking no. 9230, August 7, 1924 (tree 4 m. tall); same locality, alt. 1300 m., *R. C. Ching*, no. 3034, July 15, 1925 (shrub 10 m. tall); on the way to Chu hwa shan, alt. 250 m., *R. C. Ching*, no. 2751, June 25, 1925 (small tree 6 m. tall); west Chemen, alt. 100 m., *R. C. Ching*, no. 3191, August 9, 1925 (shrub 8 m. tall); east Wu yuan, alt. 550 m., *R. C. Ching*, no. 3313, September 4, 1925 (tree 6 m. tall).

Evonymus patens Rehder in Sargent, Trees & Shrubs, i. 127, t. 64 (1903).

Evonymus kiautschovica var. *patens* Loesener in Sargent, Pl. Wilson. i. 486 (1913).

Wang shan, *N. K. Ip*, Herb. Univ. Nanking no. 5141, August 28,

1923; near Ching yang hsien, alt. 200 m., *A. N. Steward*, no. 1235, Herb. Univ. Nanking no. 5475, August 5, 1924 (climbing on Aphananthe); same locality, *K. Ling*, no. 1117, Herb. Univ. Nanking no. 7711, August 5, 1924 (climbing on Acer); Wu yuan, *K. Ling*, no. 1310, Herb. Univ. Nanking no. 7848, August 23, 1924; Tatung, alt. 100 m., *R. C. Ching*, no. 2741, June 25, 1925 (climbing to 20 m.).

Evonymus radicans Miq. var. **acuta** Rehder in Mitt. Deutsch. Dendr. Ges. XXII. 257 (1913).

Evonymus japonica var. *acuta* Rehder in Sargent, Pl. Wilson. I. 485 (1913).

Chu hwa shan, *R. C. Ching*, no. 2632, Herb. Univ. Nanking no. 7560, April 30, 1925 (climbing to 13 m. high); Tien tai shan, Chu hwa shan, alt. 900 m., *R. C. Ching*, no. 2832, June 28, 1925 (climbing on rocky cliffs to 10 m. high); Wang shan, back of Lion Ridge, alt. 1280 m., *R. C. Ching*, no. 2980, July 12, 1925 (climbing to 12 m. high).

Monimopetalum chinense Rehder in Jour. Arnold Arb. VII. 233 (1926).

Chemen, alt. 120 m., *R. C. Ching*, no. 3096, August 3, 1925 (slender climber to 6 m. high).

Microtropis fokienensis Dunn in Jour. Linn. Soc. Bot. XXXVIII. 357 (1908).

Wang shan, back of Tei kwan tie, *K. Ling*, no. 1184, Herb. Univ. Nanking no. 9610, August 11, 1924 (small tree).

Celastrus articulata Thunberg, Fl. Jap. 97 (1784).—Hooker f. in Bot. Mag. CCXXIV. t. 7599 (1898).—Rehder & Wilson in Sargent, Pl. Wilson. II. 356 (1915).

Chu hwa shan, *R. C. Ching*, nos. 2661, 2700, Herb. Univ. Nanking nos. 7589, 7628, May 1 and 2, 1925; east of Kweichou City, alt. 150 m., *R. C. Ching*, no. 3334, September 10, 1925.

Celastrus gemmata Loesener in Bot. Jahrb. XXX. 468 (1902).—Rehder & Wilson in Sargent, Pl. Wilson. II. 352 (1915).

Wang shan, *K. Ling*, nos. 1159, 1194, 1246, Herb. Univ. Nanking nos. 7734, 7758, 7836, August 9, 11 and 14, 1924; Kimen, *N. K. Ip*, no. 48, Herb. Univ. Nanking no. 7672, August 19, 1924; Wu yuan, *K. Ling*, no. 1349, Herb. Univ. Nanking 7882, August 25, 1924; Chu hwa shan, *R. C. Ching*, no. 2638, Herb. Univ. Nanking no. 7566, May 1, 1925; Wang si chi, south Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2845, June 29, 1925; Li kan, alt. 100 m., *R. C. Ching*, no. 3165, August 7, 1925.

Celastrus hypoleuca Warburg apud Loesener in Bot. Jahrb. XXIX. 445 (1900).

South side of Wang shan, alt. 800 m., *R. C. Ching*, no. 3065, July 20, 1925.

Ching's no. 3065 is referred with some doubt to this species from which it differs in the much smaller inflorescence not exceeding 4 cm. and in the short pedicels only 5 mm. or less long.

Tripterygium Forrestii Loesener in Not. Bot. Gard. Edinb. VIII. 4, t. 2 (1913).

Tripterygium Wilfordi var. *exesum* Sprague & Takeda in Kew Bull. Misc. Inform. XXV. 222 (1912).

Wang shan, alt. 1300–1500 m., *A. N. Steward*, no. 1267, Herb. Univ. Nanking no. 7139; same locality, *K. Ling*, no. 1139, Herb. Univ. Nanking no. 9608, August 9, 1924; same locality, *R. C. Ching*, no. 3012, July 15, 1925 (climber up to 10 m. high); Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2806, June 28, 1925 (dense climbing shrub 13 m. high).

All the Chinese material I have seen seems to belong to *T. Forrestii* which may be identical with *T. Bullockii* Hance, but as long as I have not seen Hance's type I hesitate to take up as the correct name for the species Hance's *T. Bullockii* which is usually referred as a synonym to *T. Wilfordi* Hook. f. following Sprague & Takeda who, however, had included many specimens referred here to *T. Forrestii*, and their description of *T. Wilfordi* seems to be based chiefly on specimens of the former. The only specimen from Formosa which I have seen is Faurie's no. 75 collected near Kelung; this differs from *T. Forrestii* in the verruculose branchlets, the broad-elliptic abruptly short-acuminate and more coarsely crenate-serrate leaves green beneath and in the fruit being truncate at apex and at base. All the specimens of *T. Forrestii* of which I have 28 before me including isotypes of Loesener's *T. Forrestii* and Sprague's & Takeda's *T. Wilfordi* var. *exesum* are of rather uniform appearance; the leaves are ovate to ovate-oblong, long-acuminate, decidedly glaucescent beneath and rather finely serrulate or crenate-serrulate; the petioles and the midribs and veins beneath are either tomentulose, the petioles often densely so, or glabrescent or nearly if not quite glabrous. Only a specimen from Kwangtung (Pl. Mell. Sin. 890) differs markedly in the dense and fine brown tomentum of the branches and in the coarser serration of the leaves.

STAPHYLEACEAE

Determined by ALFRED REHDER

Staphylea bumalda De Candolle, Prodr. II. 2 (1825).—Shirasawa, Icon. Ess. For. Jap. II. 97, t. 40, fig. 14 27 (1908).

Tien tai shan, Chu hwa shan, alt. 1050 m., *R. C. Ching*, no. 2860, June 29, 1925 (shrub 5 m. tall).

Euscaphis japonica Dippel, Handb. Laubholzk. II. 480, fig. 229 (1892).

Euscaphis staphyleoides Siebold & Zuccarini, Fl. Jap. I. 124, t. 67 (1835).

Wang shan, alt. 1200 m., *N. K. Ip*, Herb. Univ. Nanking no. 4791, August 28, 1923, (tree 5 m. tall), *K. Ling*, no. 1241, Herb. Univ. Nanking no. 7793, August 14, 1924, (shrub 2 m. tall); Wu yuan, *K. Ling*, no. 1325, Herb. Univ. Nanking no. 7862, August 24, 1924; Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2779, June 27, 1925 (tree 8 m. tall).

ACERACEAE

Determined by ALFRED REHDER

Acer pictum var. **parviflorum** Schneider, Ill. Handb. Laubholzk. II. 225, fig. 151g (1907).—Chun, Chin. Econ. Trees, 229, t. 82 (1923).

Acer pictum var. *Mono* Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 229 (Pl. David. I. 77) (1883).—Nakai, Fl. Sylv. Kor. I. t. 12, fig. 1-4 (1915).

Lang Yah Sze, Chuchow, *A. N. Steward*, Herb. Univ. Nanking no. 2307, June 14, 1922; same locality, alt. 300 m., *A. N. Steward*, no. 1074, Herb. Univ. Nanking no. 5440, October 27, 1923 (tree 15 m. high); Tien tai shan, Chu hwa shan, alt. 1500 m., *A. N. Steward*, no. 1162, Herb. Univ. Nanking no. 5285, April 25, 1924 (tree 5 m. high); same locality, alt. 1150 m., *R. C. Ching*, no. 2788, June 28, 1925 (small tree 8 m. high).

Acer cappadocicum var. **sinicum** Rehder in Sargent, Pl. Wilson. I. 85, (1911).

Acer laetum var. *cultratum* Pax in Engler, Pflanzenr. IV. 163, 48 (1902), pro parte.—Veitch in Jour. Roy. Hort. Soc. XXIX. 354, fig. 101 (1904).

Chang gon shan, Wu Yuan, alt. 720 m., *R. C. Ching*, no. 3228, August 16, 1925 (large tree 25 m. tall).

Acer longipes Franchet apud Rehder in Sargent, Trees & Shrubs, I. 178 (1905).—Schneider, Ill. Handb. Laubholzk. II. 225, fig. 152c (1912).

Sinnin, alt. 250 m., *R. C. Ching*, no. 3262, August 21, 1925.

Acer palmatum Thunberg, Fl. Jap. 162 (1784).—Shirasawa, Icon. Ess. For. Jap. I. t. 68 (1900).

Tien tai shan, Chu hwa shan, *R. C. Ching*, no. 2828, June 28, 1925 (shrub with spreading branches, 6 m. tall); Chang gon shan, Wu yuan, alt. 750 m., *R. C. Ching*, no. 3243, August 17, 1925 (shrub 10 m. tall).

Acer Oliverianum Pax in Hooker's Icon. XIX. sub tab. 1897 (1899).—Rehder in Sargent, Trees & Shrubs I. 153, t. 77 (1905).

Wang shan, alt. 1400 m., *N. K. Ip*, Herb. Univ. Nanking no. 4794, August 28, 1923 (tree 5 m. tall); Chu hwa shan, *R. C. Ching*, no. 2625 (B), April 25, 1925 (tree 8 m. tall); same locality, *R. C. Ching*, no. 2799, June 28, 1925 (tree 8 m. tall).

Acer sinense Pax in Hooker's Icon. XIX. text to t. 1897 (1899).—Rehder in Sargent, Trees & Shrubs I. 155, t. 78 (1905).

Wang shan, alt. 750 m., *R. C. Ching*, no. 2963, July 12, 1925 (tree of medium size 15 m. tall); same locality, alt. 660 m., *R. C. Ching*, no. 3028, July 15, 1925 (slender shrub 10 m. tall); Sinnun, alt. 250 m., *R. C. Ching*, no. 3263, August 21, 1925 (tree 12 m. tall).

From typical *Acer sinense* the Anhwei specimens differ in the smaller fruits and smaller leaves not glaucescent beneath.

Acer ginnala Maximowiez in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 126 (1857). Rehder in Jour. Arnold Arb. VII. 220 (1926).—Nakai, Fl. Sylv. Kor. I. 8, t. 2 (1915).

Chu hwa shan, *R. C. Ching*, no. 2636, Herb. Univ. Nanking no. 7564, May 1, 1925 (shrub or small tree 8 m. tall); same locality, *R. C. Ching*,

no. 2702, Herb. Univ. Nanking no. 7629, May 2, 1925 (tree 10 m. tall); same locality, *R. C. Ching*, no. 2778, June 27, 1925 (small tree 4 m. tall).

All the specimens cited above belong to the form with slightly or not lobed leaves and, therefore, resemble *A. tataricum* L. from which it may be distinguished by the characters pointed out in my paper cited above.

Acer Buergerianum Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 88 (1865).
Acer trifidum Hooker & Arnott, Bot. Voy. Beechey, 174 (1841).—Koidzumi in Jour. Coll. Sci. Tokyo, XXXII. I. t. 17 (1911).

Yuting, *N. K. Ip*, Herb. Univ. Nanking no. 5144, August 24, 1923 (tree or shrub); Ching yang hsien, *K. Ling*, no. 1119, Herb. Univ. Nanking no. 7713, August 5, 1924 (tree 23 m. tall); Kimen, alt. 400 m., *K. Ling*, no. 1268, Herb. Univ. Nanking no. 7812, August 18, 1924 (tree 18 m. tall); same locality, *N. K. Ip*, no. 35, Herb. Univ. Nanking no. 7661, August 18, 1924; Shu ling hsien, alt. 400 m., *K. Ling*, no. 1288, Herb. Univ. Nanking no. 7829, August 19, 1924 (17 m. tall); Wu yuan, *K. Ling*, no. 1331, Herb. Univ. Nanking no. 7867, August 24, 1924 (tree); south Chu hwa shan, alt. 120 m., *R. C. Ching*, no. 2890, July 3, 1925 (tree 25 m. tall); Wang shan, alt. 300 m., *R. C. Ching*, no. 2896, July 5, 1925 (large tree 19 m.); Yeh hsien, alt. 105 m., *R. C. Ching*, no. 3082, July 27, 1925 (tree 10 m. tall); same locality, *K. Ling*, no. 1264, Herb. Univ. Nanking no. 7808, August 15, 1924 (tree 20 m. tall).

Acer cordatum Pax in Hooker's Icon. XIX. sub. t. 1897 (1889).—Schneider, Ill. Handb. Laubh. II. 214 fig. 142, g-k (1912).

West Siunin, alt. 360 m., *R. C. Ching*, no. 3260, August 18, 1925 (shrub 5 m. tall).

Acer Davidi Franchet in Nouv. Arch. Mus. Paris, sér. 2, VIII. 212 (Pl. David. II. 30) (1884).—Anon. in Gard. Chron. ser. 3, LXI. 46, fig. 17 (1917).

Wang so chu, south Chu hwa shan, alt. 540 m., *R. C. Ching*, no. 2875, June 30, 1925 (tree 11 m. tall); Chemen, alt. 560 m., *R. C. Ching*, no. 3173, August 8, 1925 (tree 18 m.).

Acer Grosseri Pax in Engler, Pflanzenr. IV.-162, p. 80 (1902).—Rehder in Jour. Arnold Arb. VII. 222 (1926).

Chu hwa shan, alt. 1300 m., *A. N. Steward*, no. 1169, Herb. Univ. Nanking no. 5291, April 25, 1924 (tree 6 m. high); same locality, *R. C. Ching*, no. 2613, Herb. Univ. Nanking no. 7538, April 29, 1925 (small tree with long erect branches, 6 m. tall).

This and the following species are closely related to *A. Davidi* Franch. on one side and to *A. laxiflorum* Pax or *A. Maximowiczii* Pax on the other; the differences are pointed out in my paper cited above.

Acer Hersii Rehder in Jour. Arnold Arb. III. 217 (1922), speciminibus plurimis excludendis; VII. 222 (1926).

Tien tai shan, Chu hwa shan, *R. C. Ching*, no. 2789, June 28, 1925 (shrub of spreading habit, 6 m. tall).

Acer Henryi Pax in Hooker's Icon. XIX. t. 1896 (1889).—Anon. in Gard. Chron. ser. 3, LXXVII. 193, suppl. (1925).

Wu yuan, alt. 600 m., *R. C. Ching*, no. 3255, August 18, 1925 (shrub 10 m. tall).

SAPINDACEAE

Determined by ALFRED REHDER

Sapindus mukorossi Gaertner, Fruct. I. 342, t. 70 (1788).—Shirasawa, Icon. Ess. For. Jap. I. t. 71 (1900).

Chuchow, *L. F. Tsu*, Herb. Univ. Nanking no. 530, June 26, 1920; Chemen, alt. 210 m., *R. C. Ching*, no. 3128, August 5, 1925 (tree 13 m. tall).

Koelreuteria paniculata Laxmann in Nov. Comm. Acad. Sci. Petrop. XVI. 561 (1772).—Ker in Bot. Reg. IV. t. 330 (1818).

Chuchow, *L. F. Tsu*, Herb. Univ. Nanking, no. 529, June 27, 1920.

Koelreuteria integrifolia Merrill in Philip. Jour. Sci. XXI. 500 (1922).

Wu yuan, *K. Ling*, no. 1335, Herb. Univ. Nanking no. 7871, August 24, 1924 (tree 14 m. tall).

SABIACEAE

Determined by ALFRED REHDER

Sabia latifolia Rehder & Wilson in Sargent, Pl. Wilson. II. 195 (1914).

Chu hwa shan, Tien tai shan, alt. 1400 m., *A. N. Steward*, no. 1168, Herb. Univ. Nanking no. 5290, April 25, 1924 (shrub; leaves reddish; flowers greenish).

The specimen does not seem to be specifically different from *S. latifolia*, though the leaves are somewhat narrower and the pubescence on their under side is restricted to the midrib and the flowers have the stamens as long or slightly longer than the petals.

Sabia spec.

Kimen, *K. Ling*, no. 1283, Herb. Univ. Nanking no. 7825, August 19, 1924.

This specimen seems nearest to *S. japonica* Maximowiez from which it differs chiefly in the short-pilose branchlets and pedicels and in the sparingly appressed-pubescent fruit. As the specimen is only in fruit, the description of this apparently new species may be deferred until the flowers are known.

Meliosma pilosa Lecomte in Bull. Soc. Bot. France, LIV. 673 (1908).

Chu hwa shan, *R. C. Ching*, no. 2664, Herb. Univ. Nanking no. 7592, May 2, 1925 (tree 10 m. tall, bark gray, smooth); Wang shan, alt. 640 m., *R. C. Ching*, no. 2964, July 12, 1925 (tree 20 m. tall, bark gray, smooth).

Meliosma myriantha Sieb. & Zucc. var. **discolor** Dunn in Jour. Linn. Soc. Bot. XXXVIII. 358 (1908).

Wang shan, *K. Ling*, no. 1285, Herb. Univ. Nanking no. 9622, August 19, 1924 (tree 12 m. tall).

Though this number is represented only by a sterile branch, I have little doubt that it is referable to Dunn's variety of which I have an isotype before me.

Meliosma pendens Rehder & Wilson in Sargent, Pl. Wilson. II. 200 (1914).

Wang si che, south Chu hwa shan, alt. 900 m., *R. C. Ching*, no. 2851, June 29, 1925 (large shrub, 6–7 m. tall).

Ching's specimen looks at first glance quite different from the type of *M. pendens;* its leaves are larger and firmer up to 14 cm. long, the whole branch and the inflorescence is much more robust, though the latter is apparently pendent, and the flowers are somewhat larger, 5–6 mm. across when fully open, but in the structure of the flowers and in the other characters I can find no difference.

Meliosma Oldhami Maximowicz in Bull. Acad. Sci. St. Pétersb. XII. 64 (1867); in Mél. Biol. VI. 263 (1868).

Chuchow, Lang yah sze, alt. 300 m., *A. N. Steward*, no. 1083, Herb. Univ. Nanking no. 5449, October 27, 1923 (tree 8 m. tall).

Meliosma sinensis Nakai in Jour. Arnold Arb. V. 80 (1924).

Chu hwa shan, *R. C. Ching*, no. 2783, June 27, 1925 (tree 10 m. tall).

Meliosma Veitchiorum Hemsley in Kew Bull. Misc. Inform. 1906, p. 155.—Bean in Kew Bull. Misc. Inform. 1910, p. 173, t.

Wang shan, alt. 1200 m., *R. C. Ching*, no. 2986, July 12, 1925 (tree, 15 m. tall, diameter of trunk 35 cm.).

RHAMNACEAE

Determined by ALFRED REHDER

Paliurus orientalis Hemsley in Kew Bull. Misc. Inform. 1894, p. 387.

Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no. 2310, June 14, 1922; Li shan, Chemen, alt. 250 m., *R. C. Ching*, no. 3123, August 5, 1925.

Paliurus hirsutus Hemsley in Kew Bull. Misc. Inform. 1894, p. 388.

Eighty li north of Chu hwa shan, *R. C. Ching*, no. 2721, May 3, 1925 (shrub with smooth gray bark); 30 li south of Tatung, alt. 100 m., *R. C. Ching*, no. 2744, June 25, 1925 (climbing shrub 20 m. high); Wu yuan, alt. 125 m., *R. C. Ching*, no. 3267, August 21, 1925 (bushy shrub 10 m. high).

The mature fruit not known to Hemsley is cup-shaped, 12–14 m. across with narrow apparently at first upright, later spreading thickish wing 2–3 mm. broad. The leaves are occasionally up to 11 cm. long and the pubescence on the veins beneath is rather sparse and scarcely fulvous. I have not seen the type, but another specimen from Kwangtung (Wulsin Exped. no. 12775) which shows a similar pubescence.

Zizyphus jujuba Mill. var. **inermis** Rehder in Jour. Arnold Arb. III. 220 (1922).

Zizyphus vulgaris var. *inermis* Bunge in Mém. Sav. Étr. Acad. Sci. St. Pétersb. II. 88 (Enum. Pl. Chin. Bor. 14) (1833).

Zizyphus sativa var. *inermis* Schneider, Ill. Handb. Laubholzk. II. 261 (1909); Nakai, Fl. Sylv. Kor. IX. 15, t. 3 (1920).

South Siumin, alt. 125 m., *R. C. Ching*, no. 3319, September 7, 1925 (tree 13 m. tall).

Berchemia Giraldiana Schneider, Ill. Handb. Laubholzk. II. 263, fig. 102 m-n, 183 k (1909).

Wu yuan, alt. 550 m., *R. C. Ching*, no. 3304, September 2, 1925 (bushy climber, 3 m. high).

Berchemia Huana Rehder, sp. nov.

Frutex ad 10 m. alte scandens, ramulis ramisque glabris laevibus, demum longitudinaliter leviter fissis viridi-brunneis lucidulis. Folia ovato-ovalia, 5–8 cm. longa, apice rotundata vel rarius obtusiuscula, basi rotundata vel subcordata, supra glabra, viridia, subtus pallidiora, in facie et ad venas venulasque satis dense breviter villosa, costa glabrescente, nervis utrinque 10–12 supra ut costa leviter impressis subtus elevatis; petioli 1.5–2 cm. longi, graciles, glabri. Panicula terminalis, glabra, valde ramosa, 12–18 cm. longa, ramis inferioribus paniculatis ad 10 cm. longis, floribus breviter pedicellatis glomerulatis; pedicelli circiter 1.5 mm. longi; alabrastra globoso-ovoidea, breviter apiculata (flores aperti non visi). Fructus oblongi, 7 mm. longi, purpureo-rubri (fide R. C. Ching, sed ut videtur nondum perfecte maturi).

Chu hwa shan, *R. C. Ching*, no. 2785, June 27, 1925 (fruiting; type).

CHEKIANG: Tien moo shan, *R. C. Ching*, no. 4999, August 19, 1924.

This new species seems most closely related to *B. floribunda* Brongn. from which it is easily distinguished by its obtuse leaves pubescent beneath. On the Chekiang specimen the under side of the leaves is not quite as densely pubescent as in the type specimen and the apex is obtusish rather than rounded.

I take pleasure in naming this handsome and distinct species in honor of Professor H. H. Hu of the National Southeastern University at Nanking.

Rhamnella obovalis Schneider in Sargent, Pl. Wilson. II. 223 (1914).

Chuchow, without name of collector, Herb. Univ. Nanking no. 1097, June 27, 1920; Wang shan, *R. C. Ching*, no. 2928, July 5, 1925 (shrub).

The specimen from Chuchow has unusually large leaves up to 11.5 cm. long and 5 cm. broad, but otherwise agrees with the type.

Sageretia theezans Brongniart in Ann. Sci. Nat. X. 360 (Mém. Fam. Rhamn. 53) (1826).—Nakai, Fl. Syl. Kor. IX. 35, t. 15a (1920).

Chu hwa shan, *R. C. Ching*, no. 2716, Herb. Univ. Nanking no. 7553, May 3, 1925 (climber, 13 m. high).

Rhamnus crenatus Siebold & Zuccarini in Abh. Akad. Münch. IV pt. II. 146 (Fl. Jap. Fam. Nat. I. 38) (1845).

Frangula crenata Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 32 (1867); Prol. Fl. Jap. 220 (1867).—Nakai, Fl. Sylv. Kor. IX. 33, t. 14 (1920).

Wang shan, alt. 100 m., *N. K. Ip*, Herb. Univ. Nanking no. 5121, August 28, 1923 (tree 8–10 m. tall); same locality, alt. 1350, 2050 m., *K. Ling*, nos. 1202, 1207, Herb. Univ. Nanking nos. 9612, 7768, August 12, 1924; same locality, alt. 600 m., *N. K. Ip*, no. 34, Herb. Univ. Nanking no. 7660, August 14, 1924 (tree 5 m. tall); Lui chu wan, on the way to Chu hwa shan, alt. 200 m., *R. C. Ching*, no. 2745, June 25, 1925 (shrub 2.5 m. tall); Li shan, Chemen, alt. 1130 m., *R. C. Ching*, no. 3115, August 5, 1925 (shrub 3 m. tall).

Rhamnus globosus Bunge in Mém. Sav. Étr. Acad. Sci. St. Pétersb. II. 88 (Enum. Pl. Chin. Bor. 14) (1833).—Schneider, Ill. Handb. Laubholzk. II. 284, fig. 195 f–f³, 1969 p-s (1909).

Chu hwa shan, *R. C. Ching*, no. 2693, Herb. Univ. Nanking no. 7621, May 2, 1925 (shrub 2 m. tall).

Rhamnus utilis Decaisne in Compt. Rend. Acad. Sci. Paris, XLIV. 1141 (1857).—Rondot, Vert de Chine, 141, t. 1 (1857).

Wu yuan, *K. Ling*, no. 1340, Herb. Univ. Nanking 7875, August 25, 1924; Low tien, 30 li from Chu hwa shan, *R. C. Ching*, no. 2662, Herb. Univ. Nanking no. 7590, May 2, 1925 (bushy shrub 4 m. tall); south Siunin, alt. 125 m., *R. C. Ching*, no. 3318, September 7, 1925.

Rhamnus Wilsonii Schneid. var. **pilosa** Rehder, var. nov.

A typo recedit foliis subtus ad costam et venas satis dense in facie laxius pilosis vel in facie fere glabris, petiolis pilosulis 1–2 mm. longis, ramulis junioribus sparse pilosulis vel fere glabris vel glabris.

Wang si che, south Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2841, June 29, 1925 (shrub 2 m. tall, rare), type; Wang shan, alt. 550 m., *R. C. Ching*, no. 2913, July 5, 1925 (sparingly branched shrub 1.5 m. tall; rare).

Except in the pubescence the two specimens cited which bear immature fruits differ little from the type of *R. Wilsonii;* the leaves are somewhat broader the larger one up to 5 cm. broad, at least in no. 2841 which also is more pubescent, while in no. 2913 the leaves are nearly glabrous between the veins and the branchlets glabrous or nearly so. The serration of the leaves is somewhat closer and finer than in the type of *R. Wilsonii.* In both specimens some of the branchlets are spinescent.

Hovenia dulcis Thunberg, Fl. Jap. 101 (1784).—Sims in Bot. Mag. L. t. 2360 (1823).—Siebold & Zuccarini, Fl. Jap. I. 135, t. 73, 74 (1840).

Wang shan, alt. 1280 m., *N. K. Ip*, Herb. Univ. Nanking no. 5139, August 28, 1923 (tree 20 m. tall); Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2802, June 28, 1925 (tree 20 m. tall); south of Kwei chow, *R. C. Ching*, no. 3338, September 10, 1925 (tree 10 m. tall).

VITACEAE

Determined by ALFRED REHDER

Vitis flexuosa Thunberg in Trans. Linn. Soc. XI. 103 (1793).—Planchon in De Candolle, Monog. Phaner. V. 347 (1887).

Chu hwa shan, alt. 600 m., *R. C. Ching*, nos. 2798 and 2803, June 28, 1925 (trailing or climbing vine 7-10 m. long); Chemen, alt. 200 m., *R. C. Ching*, no. 3131, August 5, 1925 (climbing on Pine to 12 m. high).

Ching's no. 2798 differs from typical *V. flexuosa* in the larger 3-lobed leaves, less lustrous above and less distinctly veined, and cordate at base with a wide rounded sinus; it may not belong here, though I cannot identify it with any other Chinese species.

Vitis reticulata Pampanini in Nuov. Giorn. Bot. Ital. N. ser. XVII. 429, fig. 13 (1910).—Gagnepain in Lecomte, Not. Syst. II. 12 (1911).

Wang shan, alt. 700 m., *R. C. Ching*, no. 2968, July 12, 1925 (tall strong climber, 20 m. high).

Vitis fagifolia Hu in Jour. Arnold Arb. VI. 142 (1925).

Chu hwa shan, road-side or bank of stream, *R. C. Ching*, no. 2671, Herb. Univ. Nanking no. 7599, May 2, 1925 (vine to 5 m. long; flowers sweet-scented).

Parthenocissus laetevirens Rehder in Mitt. Deutsch. Dendr. Ges. XXI. 119 (1912).

Wang shan, alt. 300 m., *R. C. Ching*, no. 2897, July 5, 1925 (climber, 20 m. high).

Parthenocissus tricuspidata Planchon in De Candolle Monog. Phaner. V. 452 (1887).—Sprague in Bot. Mag. CXXXV. t. 8287 (1909).

Ampelopsis tricuspidata Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 196 (1845).

Wu yuan, alt. 425 m., *N. K. Ip*, no. 74, Herb. Univ. Nanking no. 7690, August 22, 1920; south of Tiger ridge, Yeh hsien, alt. 150 m., *R. C. Ching* no. 3085, July 27, 1925 (climbing on trees, 15 m. high).

Parthenocissus heterophylla Merrill in Philip. Jour. Sci. XIII. Bot. 146 (1918).

Ampelopsis heterophylla Blume, Bijdr. Fl. Ned. Ind. 194 (1825).
Parthenocissus Landuk Gagnepain in Sargent, Pl. Wilson. I. 102, (1911).

Wang shan, alt. 500 m., *R. C. Ching*, no. 2921, July 5, 1925 (climbing on trees, 12 m. high).

Parthenocissus Thomsoni Planchon in De Candolle, Monog. Phaner. V. 453 (1887).

Vitis Thomsoni Lawson in Hooker f., Fl. Brit. Ind. I. 657 (1875).—Veitch in Jour. Roy. Hort. Soc. XXVIII. 396, fig. 100 (1904).

Su hsien, alt. 300 m., *R. C. Ching*, no. 3094, July 27, 1925 (climber 7 m. high).

Ampelopsis brevipedunculata Koehne var. **Hancei** Rehder in Jour. Arnold Arb. II. 177 (1921).

Ampelopsis heterophylla var. δ *Hancei* Planchon in De Candolle, Monog. Phaner. V. 457 (1887).

Chu hwa shan, alt. 150 m., *R. C. Ching*, no. 2740, June 25, 1925 (vine 4 m. high); Wang shan, alt. 300 m., *R. C. Ching*, no. 2927, July 5, 1925 (trailing vine 2 m. long).

The two specimens cited above agree in size, texture, shape and in the

very coarse crenate serration with typical var. *Hancei*, but differ in being pubescent; both numbers have the branchlets, petioles and pedicels pilose, the under side of the leaves is scabrid-pilose on the veins and stronger veinlets and the upper side nearly glabrous, while in no. 2927 the under side is pilose all over and the upper side is rough from short accumbent stiff hairs.

Ampelopsis brevipedunculata var. **kulingensis** Rehder in Bailey, Gent. Herb. I. 36 (1920).

Heh hsien, *K. Ling*, no. 1261, Herb. Univ. Nanking no. 7805 (climbing on Loropetalum).

I refer this specimen with some doubt to var. *kulingensis*, as it is very imperfect, only the basal part of the leaves being present, the upper part apparently having been eaten by some insect.

Ampelopsis Delaveyana Planchon in De Candolle, Monog. Phaner. v. 458 (1887).

Li kan, west Chemen, alt. 110 m., *R. C. Ching*, no. 3163, August 7, 1927 (climber 13 m. high); Erh sun tien, Chu hwa shan, alt. 350 m., *R. C. Ching*, no. 4023, Herb. Univ. Nanking no. 8423, June 26, 1925 (vine 3 m. high).

Ampelopsis megalophylla Diels & Gilg in Bot. Jahrb. XXIX. 466 (1900).—Sprague in Bot. Mag. CXL. t. 8537 (1914).

Wang shan, alt. 450 m., *R. C. Ching*, no. 2898, July 5, 1925 (strong climber 15 m. high); south Siunin, alt. 125 m., *R. C. Ching*, no. 3327, September 7, 1925 (strong climber 13 m. high).

Columella japonica Merrill in Philip. Jour. Sci. XIII. Bot. 145 (1918).
Vitis japonica Thunberg, Fl. Jap. 104 (1784).
Cayratia japonica Gagnepain in Lecomte, Not. Syst. I. 349 (1911).

Li shan, northwest Chemen, alt. 250 m., *R. C. Ching*, no. 4378, Herb. Univ. Nanking no. 8760, August 4, 1925 (vine, 3 m. high).

ELAEOCARPACEAE

Determined by ALFRED REHDER

Elaeocarpus chinensis Hooker f. in Bentham, Fl. Hongk. 43 (1851).

Wu yuan, alt. 125 m., *R. C. Ching*, no. 3277, August 24, 1925 (tree 13 m. tall, with gray smooth bark).

TILIACEAE

Determined by ALFRED REHDER

Tilia japonica Simonkai in Math. Termész. Közlem. Magyar Tudom. Akad. XXII. 326 (1888).
Tilia cordata var. *japonica* Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 18 (1867); Prol. Fl. Jap. 207 (1867).—Shirasawa, Icon. Ess. For. Jap. I. 115, t. 72, fig. 1–10 (1900).

Wang shan, *K. Ling*, no. 1210, Herb. Univ. Nanking no. 7771, August 12, 1924 (tree 6 m. tall); same locality, alt. 1200–1350 m., *R. C. Ching*,

nos. 2988, 3052, July 13 and 19, 1925 (tree 10–14 m. tall, with gray rough bark); south side of Wang shan, alt. 1150 m., *R. C. Ching*, no. 3068, July 20, 1925 (tree 14 m. tall); Chang gon shan, alt. 700 m., *R. C. Ching*, no. 3232, August 16, 1925 (tree 20 m. tall, with rough gray bark).

There seems to be no marked difference between the specimen cited above and specimens of *T. japonica* from Japan, except that the leaves are of firmer texture and thus resemble those of *T. insularis* Nakai which is perhaps only a variety of *T. japonica*. *Tilia japonica* has not yet been recorded from China.

Tilia Henryana Szyszylowicz in Hooker's Icon. xx. t. 1927 (1890).

West Chemen, alt. 200 m., *R. C. Ching*, no. 3179, August 8, 1925 (tree 20 m. tall).

Tilia tuan Szyszylowicz var. **breviradiata** Rehder, var. nov.

A typo praecipue recedit indumento faciei inferiorioris foliorum e pilis stellatis breviradiatis distinctis vel fere distinctis non implexis composito.—Arbor ramulis glabris et petiolis fere glabris; folia late ovata, 10–12 cm. longa et 7.5–9 cm. lata, breviter acuminata, basi leviter obliqua, subtruncata, remote dentata dentibus latissimis mucronulatis vix ad 2 mm. longis vel partim fere ad mucronem reductis subtus cinereo-tomentulosis. Fructus subglobus, 8–9 mm. longus, verrucosus.

Ma cha, alt. 600 m., *R. C. Ching*, no. 3209, August 15, 1925 (tree 12 m. tall, with gray rough bark).

This variety which has comparatively large and broad leaves differs from the type chiefly in its tomentum which consists of distinct stellate short-rayed hairs, each hair even under an ordinary lens is seen as a distinct dot not matted or felted as in the type; the color of the under side of the leaf therefore is grayish green not white or whitish. Shoot-leaves of the typical species sometimes have a grayish green under side and scattered hairs, but the rays of these hairs are elongated and more or less twisted not short and straight or nearly straight.

Tilia oblongifolia Rehder, sp. nov.

Arbor 20-metralis cortice albido laevi (fide coll.), glabra; ramuli glabri, annotini flavo-brunnei lenticellati, vetustiores flavido-cinerei; gemmae glabrae. Folia oblonga, 7–11 cm. longa et 3–4.5 cm. lata, acuminata, basi valde oblique subtruncata i. e. latere altero late cuneata, altero semicordata, integra vel raro apicem versus denticulis 1 vel 2 ad mucronem minutum reductis instructa, supra obscure viridia, in sicco reticulata, subtus pallide viridia, glabra, nervis utrinque circiter 8 ut costa trabeculisque elevatis, sed venulis obsoletis; petioli graciles, circiter 2 cm. longi. Cyma glabra, circiter 3 cm. lata, multiflora, cum pedunculo circiter 10 cm. longo; bractea cymae subaequilonga, subsessilis, basi truncata, lineari-oblonga, 15–18 mm. lata, glabra; pedunculi paullo infra medium bracteae inserti, graciles circiter 4 cm. longi; fructus subglobosi, 5–6 mm. longi (valde immaturi), verruculosi.

Foot of Wang shan, alt. 425 m., *R. C. Ching*, no. 3078, July 21, 1925.

This very distinct species seems to have its nearest relation with b *T. tuan* Szysz. which it resembles in its fruit, but is readily distinguished by its glabrousness and the oblong entire leaves. In the shape of its leaves it recalls the Japanese *T. kiusiana* Mak., but that species has closely serrulate smaller leaves, short petioles and is pubescent.

Tilia leptocarya Rehder, sp. nov.

Arbor 30-metralis, cortice fusco-cinereo scabro (fide coll.); ramuli glabri, annotini fusco-purpurei vel fusci, vetustiores ut videtur pallidiores. Gemmae subglobosae, glabrae. Folia ovata vel late ovata, 7–13 cm. longa et 4.5 -9.5 lata, sensim acuminata, basi obliqua, subcordata, vel latere altero semicordata, altero truncata, integra, interdum leviter undulata, rarius denticulo unico vel rarissime pluribus dentibus remotis brevissimis instructa, supra intense viridia, glabra, subtus glaucescens vel partim pallide viridia, papillosa, barbulis in axillis venarum exceptis glabra vel pilis stellatis pallidis plus minusve dense conspersis et fere ebarbulata, nervis utrinque 5–7 supra leviter subtus magis elevatis; petioli 2–5 cm. longi, graciles, glabri vel apicem versus stellati-pilosi. Cyma glabra vel glabrescens, multiflora, 5 6 cm. lata, cum pedunculo 10–16 cm. longa, folium subaequans; bractea anguste oblonga, pedunculum subaequans, 6–10 cm. longa, 15–23 mm. lata, obtusa, basi valde inaequali late cuneata vel subito contrata, stipite 1–2 cm. longo rarius breviore suffulta, basi pedunculo circiter per 1 cm. longitudinem tantum adnata, glabra, subtus et interdum supra leviter glaucescens; flores breviter pedicellati pedicellis tomentulosis circiter 5 mm. longis; sepala oblongo-ovata, 6–7 mm. longa, crassa, concava, extus dense tomentella, intus dense fulvido-setoso-pilosa; petala anguste oblonga, utrinque attenuata, sepalis triente longiora, 8 9 mm. longa et 3–3.5 mm. lata, ciliata; staminodia petalis paullo breviora, ligulata, 2 mm. lata, ciliata; stamina 45 50, breviter 5-adelphia, longiora petala dimidia et stylum fere aequantia, thecis disjunctis; stylus basi stellato-pilosus, stigmate 5-partito; ovarium globosum, dense albido-tomentellum. Fructus globosus vel depresso-globosus, 6–7 mm. diam., apice rotundatus vix apiculatus, 5-striatus, brunneus, pilis stellatis parvis detergibilibus plus minusve dense conspersus, tactu glabrescens, pericarpio tenui papyracea.

Anhwei: Chemen, alt. 250 m., *R. C. Ching*, no. 3177, August 8, 1925 (tree, 20 m. tall, with dark gray rough bark; type).

Southern Chekiang: without precise locality, alt. 1000 m., *R. C. Ching*, no. 2563, September 2, 1924 (tree 12 m. tall).

This is a very distinct species characterized by its entire or nearly entire leaves glaucescent beneath and glabrous or only thinly covered with small stellate hairs, by the large stipitate bracts adnate only at the base to the peduncle and the globose fruit with thin papery walls which suffer the fruit being more or less flattened and split in pressing; the fruit has only a thin covering of minute stellate hairs which is easily

rubbed off exposing the lustrous brown skin of the fruit. It does not seem to be closely related to any other known Chinese species, but the two following new species from Chekiang belong apparently in the same affinity.

Tilia leptocarya var. **triloba** Rehder, var. nov.

A typo praecipue differt foliis supra vel circa medium lobis parvis duobus acutis vel obtusiusculis interdum ad 1.5 cm. longis praeditis.—Folia subtus manifeste glauca, glabra vel basin versus vestigiis tomenti floccoso-stellati notata, ebarbulata; bracteae paullo latiores, stipite ad 3 cm. longa suffultae et basi rotundatae.

Kien te, *N. K. Ip*, Herb. Univ. Nanking, no. 6331, August 18, 1923 (type); Fang chuen, east slope behind temple, alt. 250 m., *N. K. Ip*, Herb. Univ. Nanking no. 5122, without date [1923?].

This variety differs from the type chiefly in the leaves being furnished with a lateral tooth or short lobe on each side and having their under side more distinctly glaucous with remnants of a floccose-stellate pubescence near the base. The immature fruit agrees exactly with that of the type.

In addition to the species described above descriptions of two other new species from Chekiang which show some relation to the preceding species may be appended here.

Tilia hypoglauca Rehder, spec. nov.

Arbor 20-metralis, ramuli initio tomento floccoso stellato obtecti, mox glabrescentes, annotini fusco-purpurei. Folia ovata vel triangulari-ovata, 6.5–9 cm. longa et 4–5.5 lata, acuminata, basi valde obliqua, latere altero profunde cordata, altero truncata vel subcordata, vel inferiora et minora profunde cordata et vix obliqua, sinuato-dentata utrinque dentibus 5–9 triangularibus circiter 2 mm. longis acutis et mucronulatis, supra intense viridia, subtus intense glauca, papillosa, vestigiis tomenti stellati floccosi ad basin exceptis glabra, nervis utrinque 4–6 supra leviter subtus magis elevatis; petioli graciles 2.5–3.5 cm. longi, glabri. Cyma juvenilis alabastris tantum praedita, multiflora, glabra vel sparsissime ad pedicellos densius stellato-pilosa, circiter 2.5 cm. lata, cum pedunculo 8–10 cm. longa; bractea anguste oblonga 6 cm. longa et 1.5 cm. lata, obtusa, glabra, glaucescens, obtusa, basi obliqua et late cuneata vel subtruncata, stipitata stipite circiter 1 cm. longo, pedunculo basi tantum per 0.5–1 cm. longitudinem adnata.

Chekiang: 20 li south of Siachu, alt. 950 m., *R. C. Ching*, no. 1813, June 4, 1924 (tree 20 m. tall, with dark gray rough bark).

This new species seems to be related to *T. leptocarya* and is rather similar in the color and pubescence of its leaves and in the characters of its inflorescence to its var. *triloba*, but is easily distinguished from it by the regular sinuate serration of the leaves. In the shape and serration of the leaves it resembles *T. endochrysea* Hand.-Mazz. from Hunan, but that species differs in the dense tomentum of the under side of the leaves, while its flower is very similar to that of *T. leptocarya*.

Tilia lepidota Rehder, sp. nov.

Arbor 20-metralis, cortice cinereo laevi (fide coll.); ramuli glabri, annotini fusco- vel flavido-purpurei; gemmae subglobosae, glabrae. Folia triangulari-ovato-oblonga, 7.5–12.5 longa et 3.5–6 lata, sensim acuminata, basi valde obliqua, latere altero profunde semicordata, altero truncata vel subcordata, integra vel rarissime denticulis 1–2 instructa, supra opace viridia, glabra, subtus glaucescentia, papillosa, et pilis stellatis breviradiatis lepidiformibus fulvis lucidulis satis dense conspersa, nervis utrinseus 5–7 supra leviter subtus magis elevatis; petioli glabri, graciles, 2–3 cm. longi. Cyma glabra, ut videtur multiflora (fructibus paucis immaturis), glabra, cum pedunculo gracili 7–10 cm. longa, bractea anguste oblonga 6–8 cm. et 1.5–2 cm. lata, obtusa, basi cuneata et breviter vel brevissime stipitata, supra

glabra, subtus glaucescens vel pallida, et sparse stellato-pilosa, pedunculo basi tantum per 1–1.5 cm. longitudinem adnata. Fructus immaturus, subglobosus, fuscus, laevis, pilis stellatis minutis conspera, pericarpio tenui.

SOUTHERN CHEKIANG: without precise locality, alt. 1000 m., *R. C. Ching*, no. 2385, August 10, 1924 (tree 20 m. tall; trunk 55 cm. diam., with gray smooth bark).

This tree is apparently related to *T. leptocarya* Rehd. but it is easily distinguished by the narrower leaves of firmer texture and on the under side thinly covered with scale-like fulvous and glistening stellate hairs which have short rays and leave the glaucous epidermis discernable between them; in *T. leptocarya* the stellate hairs, if present, are whitish and have longer rays and seem more easily detachable.

The three preceding species, *T. leptocarya*, *T. hypoglauca* and *T. lepidota* together with *T. endochrysea* Handel-Mazzetti seem to form a well defined and distinct section or subsection characterized by thinly stellate-pilose fruits with papery pericarp, large bracts adnate to the peduncle only at the base, rather large flowers with upright thick concave sepals inside densely covered with long stiff setose fulvous hairs (examined in *T. endochrysea* and *T. leptocarya*) and by entire or occasionally sparingly denticulate to remotely sinuate-dentate leaves of chartaceous or subcoriaceous texture.

Grewia biloba G. Don, Gen. Syst. I. 549 (1831).—Burret in Notizbl. Bot. Gart. Mus. Berlin, IX. 708 (1926).

Grewia parviflora Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 83 (Enum. Pl. Chin. Bor. 9) (1833).—Nakai, Fl. Sylv. Kor. XII. 54, t. 16 (1922).

Wang shan, alt. 650, *N. K. Ip*, no. 25, Herb. Univ. Nanking no. 7653, August 14, 1924 (tree 5 m. tall); Chu hwa shan, *R. C. Ching*, no. 2776, June 27, 1925 (bushy shrub 2 m. tall).

The two specimens cited above differ markedly in the shape of the leaves; Ching's specimen has ovate-elliptic leaves about 5.5 cm. broad, while Ip's specimen has oblong-lanceolate leaves about 10 cm. long and 3 cm. wide, but they are doubtless conspecific.

Grewia biloba var. **glabrescens** Rehder, comb. nov.

Grewia glabrescens Bentham, Fl. Hongk. 42 (1861).

Grewia parviflora var. *glabrescens* Rehder & Wilson in Sargent, Pl. Wilson. II. 371 (1915).

Wu yuan, alt. 150 m., *R. C. Ching*, no. 3274, August 22, 1925 (shrub 5 m. tall).

Burret (l. c.) doubts whether *G. glabrescens* should be referred to *G. biloba*, since Bentham says in the description "flowers few," but Ford's specimen from Hongkong of *G. glabrescens* has 5–9 flowered cymes and resembles in shape and size of the leaves very much the specimen cited above, which has oblong or oblong-lanceolate leaves narrowed at the ends, while nearly all specimens from central and northern China have ovate to elliptic leaves.

MALVACEAE

Determined by ALFRED REHDER

Urena lobata L. var. **tomentosa**, Walpers in Nov. Act. Acad. Leop.-Carol. XIX. suppl. I. 304 (1843).—Hochreutiner in Ann. Conserv. Jard. Bot. Genève, v. 139 (1901).

Urena lobata var. *scabriuscula* A. Gray, Bot. Phaner. I. 169 (in Wilkes, U. S. Explor. Exped. XV) (1854).—Vix *U. scabriuscula* DC.

Li shan, northwest Chemen, alt. 150 m., *R. C. Ching*, no. 4344, Herb. Univ. Nanking no. 8726, August 3, 1925 (herb, 60 cm. tall).

Hibiscus mutabilis Linnaeus, Sp. 694 (1753).—Ker in Bot. Reg. VII. t. 589 (1821).

Wu yuan, *K. Ling*, no. 1322, Herb. Univ. Nanking no. 7860, August 24, 1924.

Hibiscus syriacus Linnaeus, Sp. 695 (1753).—Curtis in Bot. Mag. III. t. 83 (1790).

Tien chan, Herb. Univ. Nanking no. 962, August 16, 1915; Wu yuan, alt. 425 m., *N. K. Ip*, no. 67, Herb. Univ. Nanking no. 7685, August 20, 1924; Yeh hsien, alt. 150 m., *R. C. Ching*, no. 3081, July 27, 1925 (shrub 5 m. tall; flowers purplish); Tiger ridge, Yeh hsien, alt. 250 m., *R. C. Ching*, no. 3084, July 27, 1925 (shrub 3 m. tall, flowers white); Li shan, Chemen, open hillside, rare, alt. 500 m., *R. C. Ching*, no. 3118, August 5, 1925 (tall shrub; flowers white, double).

STERCULIACEAE

Determined by ALFRED REHDER

Firmiana simplex W. F. Wight in Bull. U. S. Dept. Agric. Bur. Pl. Indust. CXLII. 67 (1909).

Sterculia platanifolia Linnaeus f., Suppl. 423 (1781).—Shirasawa, Icon. Ess. For. Jap. II. t. 51, fig. 10–34 (1908).

West Chemen, in open garden, alt. 100 m., *R. C. Ching*, no. 3187, August 9, 1925 (tree 10 m. tall).

DILLENIACEAE

Determined by ALFRED REHDER

Actinidia arguta Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 15 (1867).

Actinidia polygama Hooker f. in Bot. Mag. LII. t. 7497 (1896).—Non Maximowicz.

Wang shan, alt. 1400 m., *R. C. Ching*, no. 3046, July 17, 1925 (climber, 12 m. high); Wu yuan, alt. 900 m., *R. C. Ching*, no. 3254, August 17, 1925 (strong climber 10 m. high).

Actinidia polygama Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 64 (Prim. Fl. Amur.) (1859). Ito & Kaku, Fig. Descript. Pl. Koishik. Bot. Gard. II. t. 20 (1883).

Chang suin, alt. 700 m., *A. N. Steward*, no. 1356, Herb. Univ. Nanking no. 7226, August 14, 1924 (shrub 3 m. tall); T'an k'ou, Wang shan, *K. Ling*, no. 1249, Herb. Univ. Nanking no. 7797, August 14, 1924; foot of Wang shan, alt. 300 m., *R. C. Ching*, no. 3054, July 20, 1925 (dense climber 12 m. high).

Actinidia chinensis Planchon in Lond. Jour. Bot. VI. 303 (1847).—Sprague in Bot. Mag. CXL. t. 8538 (1914).

Chu hwa shan, *R. C. Ching*, nos. 2639, 2678, Herb. Univ. Nanking nos. 7567, 7606, May 1 and 2, 1925 (strong climber 15–20 m. high); Wang shan, alt. 550 m., *R. C. Ching*, no. 2910, July 5, 1925 (strong climber 12 m. high).

Actinidia spec.

Wu yuan, alt. 125 m., *R. C. Ching*, no. 3269, August 21, 1925 (strong climber, 12 m. high); south Siunin, alt. 125 m., *R. C. Ching*, no. 3321, September 7, 1925 (strong twining climber 12 m. high).

The two specimens cited above which are in fruit belong to the group Maculatae Dunn and seem most closely related to *A. coriacea* Dunn known only from Szechuan and northern Yunnan, but they differ in their less thickish leaves with impressed midrib and channeled petiole, in the unbranched peduncle and in the light yellowish gray branchlets. From *A. callosa* Lindl. which has lamellate pith they differ in the solid pith of the branches and the subcoriaceous leaves and from *A. rubricaulis* Dunn in the pale branchlets and the ovary which is pubescent according to Ching's no. 2487 from Chekiang with young fruit and apparently identical with nos. 3269 and 3321 from Anhwei. I have little doubt that these specimens represent a new species, but without having seen the flowers I hesitate to propose it as such.

THEACEAE

Determined by ALFRED REHDER

Thea oleosa Loureiro, Fl. Cochin. 339 (1790).

Camellia drupifera Loureiro, l. c. 441 (1790).

Camellia oleifera Abel, Narr. Jour. China, 363, t. 174 (1818).—Lindley in Bot. Reg. XI. t. 942 (1825).

Wang shan, *N. K. Ip*, Herb. Univ. Nanking no. 5118, August 28, 1923; Kimen hsien, alt. 500 m., *K. Ling*, no. 1267, Herb. Univ. Nanking no. 7811, August 18, 1924 (shrub 3 m. tall); Li shan, northwest Chemen, alt. 850 m., *R. C. Ching*, no. 3142, August 6, 1925 (bushy shrub 5 m. tall); Li kan, west Chemen, alt. 110 m., *R. C. Ching*, no. 3161, August 7, 1925 (tree 10 m. tall, with smooth chalky white bark).

Thea fraterna Kuntze, Rev. Gen. Pl. I. 65 (1891).—Rehder & Wilson in Sargent, Pl. Wilson. II. 390 (1915).

Camellia fraterna Hance in Ann. Sci. Nat. sér. 4, XVIII. 218 (1862).

Kau toun, Tai ping hsien, alt. 150 m., *R. C. Ching*, no. 2885, July 3, 1925 (erect shrub 5 m. tall; with young fruit).

Thea cuspidata Kochs in Bot. Jahrb. XXVII. 586 (1900).

Camellia cuspidata Veitch in Gard. Chron. ser. 3, LI. 262, fig. 123 (1912); in Jour. Hort. Soc. London, XXXVIII. p. lxii, fig. 38 (1912).

Chu hwa shan, alt. 900 m., *A. N. Steward*, no. 1185, Herb. Univ. Nanking no. 5302, April 25, 1924 (shrub 1 m. tall; flowers white); Wang shan, about Tiao chiao, alt. 1100 m., *A. N. Steward*, no. 1260, Herb. Univ. Nanking no. 5499, August 9, 1924 (shrub 2 m. tall); Yeh hsien, alt. 300 m., *R. C. Ching*, no. 3089, July 27, 1925 (bushy shrub 5 m. tall).

Thea microphylla Merrill in Jour. Arnold Arb. VIII. 9 (1927).

Wu yuan, *N. K. Ip*, Herb. Univ. Nanking no. 7686, August, 1924 (ex Merrill); Shu ling hsien, *K. Ling*, no. 1289, Herb. Univ. Nanking no. 7830,

August 19, 1924; Ma chi, Siunin, alt. 300 m., *R. C. Ching*, no. 3214, August 14, 1925 (dense bushy shrub, 2 m. tall).

To this species may be referable a sterile specimen collected by Ching at Li shan, northwest Chemen (no. 3108, alt. 175 m., August 3, 1925) and described as a bushy shrub 1.60 m. tall; it differs, however, in its larger distinctly obovate or obovate-oblong, 2.5–3.15 cm. long leaves. I consider, however, Ching's no. 2160 from Chekiang referred doubtfully by Merrill to *T. microphylla* a very distinct species of which I append a description.

Thea trichoclada Rehder, sp. nov.

Frutex 1-metralis; ramuli graciles juniores dense pilis patentibus pallidis ad 2 mm. longis ad tertium annum persistentibus obsiti; gemmae parvae glabrae. Folia disticha, ovato-elliptica ad ovato-oblonga, 1.5–2 cm. (in specimene typico, in altero ad 3 cm. longa) apice obtusiuscula, basi rotundata interdum ea in apice ramulorum late cuneata, toto margine ima basi excepta dense et minute crenato-serrata, supra laete viridia, costa media vix vel leviter elevata breviter pilosa excepta glabra, subtus pallidiora, glabra, ad costam mediam non vel vix elevatam pustulata, nervis utrinseeus 5–6 supra vix vel levissime elevatis subtus obsoletis; petioli pilosi, vix 1 mm. longi. Fructus brevissime pedunculatus; calyx circiter 5 mm. diam., persistens, sepalis 5 rotundatis latioribus quam longis ut bracteae pedunculi glabra, minute ciliolata; capsula glabra, leviter verruculosa, subglobosa, 8–10 mm. diam., monosperma, pericarpio tenui fragili.

CHEKIANG: Tai shun City, under trees on hill slope, *Y. L. Keng*, no. 324, August 10, 1926 (type); northeast of Tai suom, under dense shade, *R. C. Ching*, no. 2160, July 18, 1924 (shrub 1 m. tall).

This very distinct species is similar to *T. microphylla* Merr. but is easily distinguished by the long spreading hairs of the branchlets, the ovate to ovate-oblong leaves broadest below the middle, rounded at base or only toward the apex of the branchlets broad-cuneate, by the persistent sepals and the smaller glabrous fruit.

Thea sinensis Linnaeus, Sp. 515 (1753).

Thea chinensis Sims in Bot. Mag. xxv. t. 998 (1807).
Camellia theifera Griffith, Notul. Pl. As. iv. 558, t. 601, fig. 1, 3, (1854).
Camellia Thea Link, Enum. Hort. Berol. ii. 73 (1822).
Camellia sinensis Kuntze in Act. Hort. Petrop. x. 195 (1887).

Wang shan, alt. 550 m., open moist hillsides, common, *R. C. Ching*, no. 2907, July 5, 1925 (bushy shrub 3 m. tall).

In regarding to the priority of the generic name Thea, I may refer to my remarks in an earlier issue of this Journal (v. 238).

Schima superba Gardner & Champion in Hooker's Jour. Bot. & Kew Gard. Misc. i. 246 (1849).—Seemann, Bot. Voy. Herald, 367, t. 75 (1857).
Schima Noronhae Hemsley in Jour. Linn. Soc. xxiii. 80 (1886).—Non Reinwardt.

South Wu Yuan, alt. 125 m., *R. C. Ching*, no. 3281, August 25, 1925 (tree 20 m. tall); Tongmun, *P. Heude*, about 1874 (ex Hemsley, l. c.).

Stewartia sinensis Rehder & Wilson in Sargent, Pl. Wilson. ii. 395 (1915).

Wang shan, *K. Ling*, no. 1198, Herb. Univ. Nanking no. 7761, August 11, 1924 (shrub); same locality, alt. 1100–1350 m., *R. C. Ching*, nos. 3006, 3023, July 13 and 15, 1925 (shrub 12 m. tall).

Ternstroemia gymnanthera Sprague in Jour. Bot. LXI. 18 (1923), see also pp. 52, 83–84.

Ternstroemia japonica Siebold. & Zuccarini, Fl. Jap. I. 148, t. 80 (1841).—Non Thunberg.

Cleyera gymnanthera Wight & Arnott, Prodr. 87 (1834).

Li kan, west Chemen, alt. 100 m., *R. C. Ching*, no. 3160, August 7, 1925 (bushy shrub 2 m. tall).

Ternstroemia nitida Merrill in Jour. Arnold Arb. VIII. 10 (1927).

East Wu yuan, alt. 250 m., *R. C. Ching*, no. 3314, September 4, 1925 (shrub 1.75 m. tall).

Adinandra Millettii Bentham & Hooker apud Hance in Jour. Bot. XVI. 9 (1878).

Cleyera Millettii Hooker & Arnott, Bot. Voy. Beechey, 171, t. 33 (1841).

Kimen, alt. 400 m., *N. K. Ip*, no. 47, and *K. Ling*, no. 1272, Herb. Univ. Nanking nos. 7671 and 7815, August 18 and 19, 1924; Li kan, west Chemen, alt. 100 m., *R. C. Ching*, no. 3153, August 7, 1925 (shrub, 5 m. tall).

Tristylium ochnaceum Merrill in Philip. Jour. Sci. XIII. 148 (1918).

Cleyera ochnacea De Candolle in Mém. Soc. Phys. Genève, I. 412 (1822); Prodr. I. 524 (1824).

Eurya ochnacea Szyszylowicz in Engler & Prantl, Nat. Pflanzenfam. III. 6, p. 189 (1893).

Wang shan, *K. Ling*, no. 1139, Herb. Univ. Nanking no. 7723, August 8, 1924; same locality, alt. 650 m., *R. C. Ching*, no. 2899, July 5, 1925 (shrub 6 m. tall); Shu ling hsien, alt. 600 m., *K. Ling*, no. 1292, Herb. Univ. Nanking no. 7833, August 21, 1924 (tree 5 m. tall, trunk 10 cm. diam.); south Chemen, alt. 250 m., *R. C. Ching*, no. 3207, August 13, 1925 (tree 12 m. tall, trunk 25 cm. diam., with gray smooth bark).

Eurya japonica Thunb. var. **nitida** Dyer in Hooker f., Fl. Brit. Ind. I. 284 (1874).—Pierre, Fl. Cochin. II. t. 126 (1887).

Wang shan, alt. 1200 m., *N. K. Ip*, Herb. Univ. Nanking nos. 4771 and 5142, August 28, 1923; same locality, *K. Ling*, no. 1140, Herb. Univ. Nanking no. 7724, August 9, 1924 (shrub 2 m. tall); same locality, alt. 550–1450 m., *R. C. Ching*, nos. 2908, 2992 and 3016, July 5, 13 and 15, 1925 (dense shrub 3–8 m. tall); Chu hwa shan, *R. C. Ching*, no. 2694, Herb. Univ. Nanking no. 7622, May 2, 1925 (shrub 1.75 m. tall).

Ching's no. 2992 which has rather small obtusish leaves only 2–3 cm. long approaches by its somewhat coarser serration typical *E. japonica* Thunb.

GUTTIFERAE

Determined by ALFRED REHDER

Hypericum chinense Linnaeus, Syst. Nat. ed. 10. 1184 (1759).—Curtis, Bot. Mag. IX. t. 334 (1795).

Liu yung chun, 60 li south of Ping yung, shaded road-side, *R. C. Ching*, no. 2879, June 30, 1925 (shrub 1 m. tall; cultivated); Li shan, northwest Chemen, alt. 175 m., *R. C. Ching*, no. 3137, August 5, 1925 (shrub 1 m. tall).

FLACOURTIACEAE

Determined by ALFRED REHDER

Xylosma congestum Merrill in Philip. Jour. Sci. xv. 247 (1919)

Xylosma racemosum Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 155 (1865–66).
Hisingera racemosa Siebold & Zuccarini, Fl. Jap. I. 169, 189, t. 88, 100, fig. III. 1–14 (1835).

I hsien, *K. Ling*, no. 1265, Herb. Univ. Nanking no. 7809, August 15, 1924; Wu yuan, alt. 175 m., *R. C. Ching*, no. 3266, August 21, 1925 (tree 12 m. tall, trunk 60 cm. diam., with gray bark).

Idesia polycarpa, Maximowicz in Bull. Acad. Sci. St. Pétersb. x. 485 (1866); in Mél. Biol. VI. 19 (1866).—Hooker f. in Bot. Mag. CXI. t. 6794 (1885).—Chun, Chin. Econ. Trees, 254, fig. 88 (1923).

Chemen, alt. 200 m., *R. C. Ching*, no. 3178, August 8, 1925 (tree 20 m. tall, trunk 25 cm. diam., with gray smooth bark).

Idesia polycarpa var. **vestita** Diels in Bot. Jahrb. XXIX. 478 (1900).

Wang shan, alt. 1150 m., *R. C. Ching*, no. 2997, July 13, 1925 (tree 12 m. tall, trunk 30 cm. diam. with gray smooth bark).

STACHYURACEAE

Determined by ALFRED REHDER

Stachyurus chinensis Franchet in Jour. de Bot. XII. 254 (1898).

Chu hwa shan, Tien tai shan, *A. N. Steward*, no. 1151, Herb. Univ. Nanking no. 5283, April 25, 1924; Chu hwa shan, *R. C. Ching*, no. 2589, Herb. Univ. Nanking no. 7586, April 28, 1925 (bushy shrub 6 m. tall); Chu hwa shan, Wang si che, alt. 600 m., *R. C. Ching*, no. 2847, June 29, 1925 (shrub 6 m. tall); Wang shan, *K. Ling*, no. 1187, Herb. Univ. Nanking no. 9611, August 11, 1924.

ELAEAGNACEAE

Determined by ALFRED REHDER

Elaeagnus multiflora Thunberg, Fl. Jap. 66 (1784).—Hooker f. in Bot. Mag. CXX. t. 7341 (1894).

Elaeagnus edulis A. Gray in Mem. Am. Acad. Sci. n. ser. VI. 405 (1859).

Chu hwa shan, Tien tai shan, alt. 900 m., *A. N. Steward*, no. 1177, Herb. Univ. Nanking no. 5416, April 25, 1924 (shrub 1–2 m. tall); same locality, alt. 1200 m., *R. C. Ching*, no. 2857, June 29, 1925 (many-stemmed shrub 5 m. tall); Chu hwa shan, *R. C. Ching*, no. 2600, Herb. Univ. Nanking no. 7525, April 28, 1925 (shrub 5 m. tall); 40 li south of Tatung, *R. C. Ching*, no. 2714, Herb. Univ. Nanking no. 7580, May 3, 1925 (shrub 8 m. tall).

Elaeagnus pungens Thunberg, Fl. Jap. 68 (1784).—Schneider, Ill. Handb. Laubholzk. II. 413, fig. 281d–g, 282a (1909).

Chuchow, Lang yah sze, alt. 300 m., *A. N. Steward*, no. 1084, Herb. Univ. Nanking no. 5450, October 27, 1923 (shrub 2 m. tall); Chu hwa shan, Tien tai shan, alt. 900 m., *A. N. Steward*, no. 1178, Herb. Univ.

Nanking no. 5297, April 25, 1924 (shrub 2 m. tall); Chu hwa shan, exposed rocky slope, *R. C. Ching*, no. 2610, April 29, 1925 (bushy shrub 4 m. tall).

LYTHRACEAE

Determined by ALFRED REHDER

Lagerstroemia indica Linnaeus, Sp. ed. 2, p. 734 (1764).—Curtis, Bot. Mag. XII. t. 405 (1798).

West Chemen, alt. 100 m., *R. C. Ching*, no. 3186, August 8, 1925 (shrub 2.5 m. tall).

Lagerstroemia subcostata Koehne in Bot. Jahrb. IV. 20 (1883); in Engler, Pflanzenr. IV–216, p. 260 (1903).

South of Chu hwa shan, alt. 125 m., *R. C. Ching*, no. 2891, July 3. 1925 (shrub 6 m. tall); south Chemen, alt. 125 m., *R. C. Ching*, no. 3202, August 13, 1925 (shrub 6 m. tall).

The two specimens cited above represent the typical form (var. α. *hirtella* Koehne, l. c.) of which Koehne cites only specimens from Formosa and the Liukiu Islands. Of the glabrous form (var. β *glabra* Koehne, l. c.) I have before me Hu's no. 1302 from Kiangsi.

NYSSACEAE

Determined by ALFRED REHDER

Nyssa sinensis Oliver in Hooker's, Icon. XX. t. 1964 (1891).—Wangerin in Engler, Pflanzenr. IV.–220a, p. 10 (1910).—Chun, Chin. Econ. Trees, 259, fig. 89 (1923).

Chu hwa shan, *R. C. Ching*, no. 2648, Herb. Univ. Nanking no. 7576, May 1, 1925 (tree 27 m. tall); Wang shan, alt. 675 m., *R. C. Ching*, no. 3031, July 15, 1925 (tree 18 m. tall).

ALANGIACEAE

Determined by ALFRED REHDER

Alangium chinense (Lour.) Rehder in Sargent, Pl. Wilson. II. 552 (1916).

Marlea begoniifolia Roxburgh, Hort. Beng. 28 (1814), nom. nudum; Pl. Corom. III. 80, t. 283 (1819).

Alangium begoniifolium Baillon, Hist. Pl. VI. 270 (1877).—Wangerin in Engler, Pflanzenr. IV.-220b, p. 20, fig. 5 (1910).

North foot of Chu hwa shan, alt. 350 m., *R. C. Ching*, no. 2762, June 26, 1925 (tree 14 m. tall); Chu hwa shan, Tien tai shan, alt. 1175 m., *R. C. Ching*, no. 2827, June 28, 1925 (tree 8 m. tall); Chemen, alt. 300 m., *R. C. Ching*, no. 3121, August 5, 1925 (slender shrub 6 m. tall).

MYRTACEAE

Determined by ALFRED REHDER

Eugenia microphylla Abel, Narr. Jour. China, 181, 364 (1818).

Eugenia sinensis Hemsley in Jour. Linn. Soc. XXIII. 298 (1887).

Wu yuan, *K. Ling*, no. 1348, Herb. Univ. Nanking no. 7881, August 25, 1924 (shrub 2 m. tall); same locality, alt. 680 m., *R. C. Ching*, nos.

3306 and 3311, September 4, 1925 (shrub 5 m. tall); Li shan, northwest Chemen, alt. 250 m., *R. C. Ching*, no. 3106, August 3, 1925 (bushy shrub 4.5 m. tall).

The specimens cited above except Ching's no. 3311 have the small leaves not exceeding 1.5 cm. of typical *E. microphylla*; among the numerous specimens before me referred to this species all transitions between the small-leaved form and Ching's no. 3311 which has leaves up to 3.5 cm. long and 2 cm. broad, the largest of any, except Ching's no. 1981 from Chekiang which has leaves up to 4.5 cm. long, but they are elliptic-lanceolate and not more than 1.5 cm. broad.

ARALIACEAE

Determined by ALFRED REHDER

Gilibertia sinensis Nakai in Jour. Arnold Arb. v. 24, (1924).

Gilibertia japonica Hemsley in Jour. Linn. Soc. XXIII. 342 (1888).—Non Seemann.

Wang shan, alt. 1500 m., *N. K. Ip*, Herb. Univ. Nanking nos. 4781 and 5143, August 28, 1923 (tree 8 m. tall); same locality, alt. 1100 m., *A. N. Steward*, no. 1269, Herb. Univ. Nanking no. 7141, August 9, 1924 (tree 7 m. tall; diam. of trunk 15 cm.); Wu yuan, alt. 650 m. *R. C. Ching*, no. 2937, July 11, 1925; Wu yuan, Chang gon shan, alt. 750 m., *R. C. Ching*, no. 3229, August 16, 1925 (tree 8 m. tall); west Chemen, alt. 550 m., *R. C. Ching*, no. 3181, August 8, 1925.

Hedera nepalensis K. Koch var. **sinensis** Rehder in Jour. Arnold Arb. IV. 250 (1923).

Hedera helix Hance in Jour. Bot. XX. 6 (1882).—Non Linnaeus.

Hedera himalaica var. *sinensis* Tobler, Gatt. Hedera, 79, figs. 39-42 (1912).

Chu hwa shan, Chi yen sze, alt. 900 m., *A. N. Steward*, no. 1143, Herb. Univ. Nanking no. 7405, April 24, 1924 (woody vine; fruit red); Chu hwa shan, *R. C. Ching*, no. 2621, April 29, 1925 (climbing on cliffs or tree trunks; fruit orange-yellow).

Acanthopanax Hondae Matsuda in Tokyo Bot. Mag. XXXI. 333 (1917). —Nakai in Jour. Arnold Arb. v. 3 (1924).

Ching yang hsien, *K. Ling*, no. 1118, Herb. Univ. Nanking no. 7712, August 5, 1924 (young fruits abnormal, affected by a gall insect); Chu hwa shan, *R. C. Ching*, nos. 2650 and 2705, Herb. Univ. Nanking nos. 7578 and 7632, May 1 and 2, 1925 (shrub 3 m. tall); Wang si che, south Chu hwa shan, alt. 550 m., *R. C. Ching*, no. 2864, June 30, 1925.

The specimens enumerated above all represent the spineless form, f. *inerme* Matsuda (l. c.).

Acanthopanax Sieboldianus Makino in Tokyo Bot. Mag. XII. 10 (1898).— Rehder in Jour. Arnold Arb. VII. 243 (1926).

Acanthopanax spinosum Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 10 (1863), quoad descriptionem.—Non *Panax spinosa* L. f. nec *Aralia pentaphylla* Thunb.

Acanthopanax pentaphyllum Marchal in Bull. Soc. Bot. Belg. XX. 79 (1881).— Non *Aralia pentaphylla* Thunb.

Wang shan, alt. 1800 m., *N. K. Ip*, Herb. Univ. Nanking no. 4783, August 28, 1923; same locality, alt. 1900 m., *K. Ling*, no. 1172, Herb. Univ. Nanking no. 7745, August 11, 1924 (shrub 6 m. tall).

This species has apparently not yet been recorded from China, the Acanthopanax from China of most authors being *A. Hondae* Matsuda, or *A. gracilistylus* W. W. Sm.

Acanthopanax evodiaefolius Franchet in Jour. de Bot. x. 306 (1896).—Harms in Mitt. Deutsch. Dendr. Ges. xxvii. 29, t. 4, fig. a-c (1918).

Wang shan, *K. Ling*, no. 1193, Herb. Univ. Nanking no. 7757, August 11, 1924; Chu hwa shan, Tien tai shan, alt. 1200 m., *R. C. Ching*, no. 2814, June 28, 1925 (tree 7 m. tall); Chang gon shan, west Wu yuan, alt. 725 m., *R. C. Ching*, no. 3218, August 16, 1925 (tree 9 m. tall).

Aralia chinensis Linnaeus, Sp. 273 (1753).—Seemann in Jour. Bot. vi. 133 (1868); Rev. Heder. 19 (1869).—Nakai in Jour. Arnold Arb. v. 31 (1924).

Wang shan, *K. Ling*, no. 1240, Herb. Univ. Nanking no. 9619, August 14, 1924, (shrub 1.5 m. tall).

Aralia chinensis var. **nuda** Nakai in Jour. Arnold Arb. v. 32 (1924).

Aralia chinensis var. *glabrescens* Harms & Rehder in Sargent, Pl. Wilson. ii. 567 (1911).—Non C. Schneider.

Wang si che, south Chu hwa shan, alt. 900 m., *R. C. Ching*, no. 2840, June 29, 1925 (tree 9 m. tall).

CORNACEAE

Determined by Alfred Rehder

Helwingia japonica F. G. Dietrich, Nachtr. Vollst. Lex. Gärtn. Bot. iii. 660 (1817).—Shirasawa, Icon. Ess. For. Jap. ii. t. 58, fig. 1–9 (1908).

Helwingia rusciflora Willdenow, Sp. iv. 716 (1805).

Wang shan, near Tan lin, alt. 1300 m., *A. N. Steward*, no. 1263, Herb. Univ. Nanking no. 7135, August 9, 1924 (shrub 2 m. tall); Chu hwa shan, *R. C. Ching*, no. 2590 (Herb. Univ. Nanking no. 7515) and no. 2800, April 28, and June 28, 1925 (shrub 1.75 m. tall).

Cornus controversa Hemsley in Bot. Mag. cxxxv. in textu ad t. 8261 (1909).—Wangerin in Engler, Pflanzenr. iv. 229, 49, fig. 14, c–d (1910).

Cornus macrophylla Clarke in Hooker f., Fl. Brit. Ind. ii. 744 (1879), pro parte.—Shirasawa, Icon. Ess. For. Jap. i. 121, t. 77, fig. 17–23 (1900).—Non Wallich.

Chu hwa shan, *R. C. Ching*, no. 2795, June 28, 1925 (tree 18 m. tall); Wang shan, alt. 1200 m., *R. C. Ching*, no. 2987, July 13, 1925 (tree 12 m. tall, trunk 36 cm. diam., with gray rough bark); without precise locality, *R. C. Ching*, no. 2730, in 1925.

Cornus kousa Buerger apud Hance in Jour. Linn. Soc. xiii. 105 (1873).—Bean in Bot. Mag. cxlvi. t. 8833 (1920).

Wang shan, *K. Ling*, no. 1147, Herb. Univ. Nanking no. 7728, August 9, 1924; same locality, alt. 950 m., *R. C. Ching*, no. 3004, July 13, 1925 (tree 8 m. tall); Chu hwa shan, *R. C. Ching*, no. 2646, Herb. Univ.

Nanking no. 7574, May 1, 1925 (tree 7 m. tall); Tien tai shan, Chu hwa shan, *R. C. Ching*, no. 2852, June 29, 1925 (tree 8 m. tall).

The specimens cited above belong to the Chinese form distinguished as var. *chinensis* Osborn (in Gard. Chron. ser. 3, LXXII. 310 (1922).—Bean in Kew Bull. Misc. Inform. 1926, p. 321, t. 8).

CLETHRACEAE

Determined by E. H. WILSON

Clethra Fargesii Franchet in Jour. de Bot. IX. 369 (1895).—Rehder & Wilson in Sargent, Pl. Wilson. I. 502 (1913).

Wu yuan, Chang gon shan, woods, alt. 1250 m., *R. C. Ching*, no. 3237, August 17, 1925 (shrub, 10 m., bark smooth, branches gray; flowers white, fragrant; common); same locality, *K. Ling*, no. 1298, Herb. Univ. Nanking no. 7838, August 21, 1924 (tree 7 m. tall).

ERICACEAE

Determined by E. H. WILSON

Enkianthus chinensis Franchet in Jour. de Bot. IX. 371 (1895).—Rehder & Wilson in Sargent, Pl. Wilson. I. 550 (1913).

Enkianthus himalaicus var. *chinensis* Diels in Bot. Jahrb. XXIX. 508 (1900).
Enkianthus Rosthornii Diels in Bot. Jahrb. XXIX. 509 (1900).

Wang shan, woods and thickets, alt. 650 to 1500 m., *R. C. Ching*, nos. 2961, 3010 and 3044, July 12, 15 and 17, 1925 (shrub 5 to 6 m. tall; common); same locality, alt. 1600 m., *N. K. Ip*, Herb. Univ. Nanking no. 4776, August 28, 1923; same locality, *K. Ling*, no. 1162, Herb. Univ. Nanking no. 7737, August 9, 1924.

Xolisma ovalifolia var. **elliptica** Rehder in Jour. Arnold Arb. v. 52, (1924).

Andromeda elliptica Siebold & Zuccarini in Abh. Akad. Munch. IV. pt. III. 126 (Fl. Jap. Fam. Nat. II. 2) (1846).
Andromeda ovalifolia Maximowicz in Bull. Acad. Sci. St. Pétersb. XVIII. 50 (1872).—Non Wallich.
Pieris ovalifolia Hemsley in Jour. Linn. Soc. XXVI. 17 (1989), pro parte.—Shirasawa, Icon, Ess. For. Jap. II. t. 60 (1908).—Non D. Don.
Lyonia ovalifolia Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 683 (1910). Non Drude.
Pieris ovalifolia var. *elliptica* Rehder & Wilson in Sargent, Pl. Wilson. I. 552 (1913).
Pieris elliptica Nakai in Tokyo Bot. Mag. XXXIII. 207 (1919).

North foot of Chu hwa shan, alt. 400 m., side of stream, *R. C. Ching*, no. 2764, June 26, 1925 (small tree 6 m.; fairly common); Wang che, thickets, alt. 650 m., *R. C. Ching*, no. 2838, June 29, 1925 (shrub 6 m. tall, common); Wang shan, alt. 1300 m., *N. K. Ip*, Herb. Univ. Nanking no. 5113, August 28, 1923; same locality, alt. 800 m., *A. N. Steward*, no. 1250, Herb. Univ. Nanking no. 5489, August 9, 1924; Wu yuan, *K. Ling*, no. 1315, Herb. Univ. Nanking no. 7853, August 23, 1924.

Pieris japonica D. Don apud G. Don, Gen. Syst. III. 832 (1834).—

Yatabe, Icon. Fl. Jap. I. 105, t. 29, (1892).—Bean, Trees & Shrubs, Brit. Isl. II. 167, fig. (1914).

Andromeda japonica Thunberg, Fl. Jap. 181 (1784).

Chemen, wood alongside stream, alt. 230 m., *R. C. Ching*, no. 3134, August 5, 1925 (shrub 4 m. tall; rare); Wu yuan, side of stream, *K. Ling*, no. 1312, Herb. Univ. Nanking no. 7850, August 23, 1924 (tree 7 m. tall).

The finding of this common Japanese shrub in Anhwei is very interesting.

Rhododendron Fortunei Lindley in Gard. Chron. 868 (1859).—Hooker f. in Bot. Mag. XCII. t. 5596 (1866).—Wilson in Jour. Arnold Arb. VI. 159 (1925).

Chu hwa shan, Tien tai shan, cliffs, alt. 1260 m., *R. C. Ching*, no. 2813, June 28, 1925 (small tree 8 m. tall; only a few seen); Wu yuan, Chang gon shan, thickets, alt. 800 m., *R. C. Ching*, no. 3242, August 17, 1925 (tree 10 m. tall; common); Wang shan, alt. 1600 m., *K. Ling*, no. 1180, Herb. Univ. Nanking no. 9609, August 11, 1924 (bush 8 m. high).

Rhododendron anhweiense Wilson in Jour. Arnold Arb. VI. 163, (1925).

Wang shan, cliffs, alt. 1600 m., *R. C. Ching*, nos. 2996 and 3014, July 13 and 15, 1925 (bush 3 to 4 m. high, common); same locality, rocky places, alt. 1800 m., *N. K. Ip*, Herb. Univ. Nanking no. 4784, August 28, 1923 (type).

Rhododendron ovatum Planchon in Rev. Hort. 43, (1854).—Millais, Rhodod. 222, fig. facing p. 246 (1917).—Wilson in Jour. Arnold Arb. V. 103, (1924).

Azalea ovata Lindley in Jour. Hort. Soc. Lond. I. 149 (1846).—Hooker in Bot. Mag. LXXXIV. t. 5064 (1858).

Azalea myrtifolia Champion in Bot. Mag. LXXVII. sub t. 4609 (1851).

Chu hwa shan, hillsides, *R. C. Ching*, no. 2686, Herb. Univ. Nanking no. 7614, May 2, 1925 (bush 2.5 m. high); same locality, Wang si che alt. 600 m., *R. C. Ching*, no. 2868, June 30, 1925 (bush 2.5 m. high); Wang shan, *K. Ling*, no. 1235, Herb. Univ. Nanking no. 7789, August 12, 1924; Hsia ken, alt. 300 m., *A. N. Steward*, no. 1100, Herb. Univ. Nanking no. 5230, April 22, 1924, (bush 1 m. high; flowers lavender).

Rhododendron pittosporaefolium Hemsley in Jour. Linn. Soc. XXVI. 29 (1889).—Wilson in Jour. Arnold Arb. V. 105 (1924).

Rhododendron stamineum Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, p. 116.—Hutchinson in Bot. Mag. CXLI. t. 8601 (1915).—Non Franchet.

South Siumin, open thickets, alt. 400 m., *R. C. Ching*, no. 3331, September 7, 1925 (bush 5 m. high; common).

As the specimen is in fruit the identification is somewhat doubtful. It may represent a new species.

Rhododendron spec.

Wu yuan, woodlot, *K. Ling*, no. 1316, Herb. Univ. Nanking no. 7854, August 24, 1924.

Apparently closely related to *R. pittosporaefolium* Hemsl. but with shorter and broader leaves, usually abruptly rounded and even inclined

to be auricled at the base. The specimen is in fruit and insufficient for accurate identification.

Rhododendron Simsii Planchon in Fl. des Serres IX. 78 (1854).—Wilson in Wilson & Rehder, Monog. Azal. 45 (1921), where complete references and synonymy and a full account of the species are given.

Azalea indica Aiton, Hort. Kew, ed. 2, 318 (1810).—Sims in Bot. Mag. XXXVI. t. 1480 (1812). Non Linnaeus.

Chu hwa shan, hillsides, *R. C. Ching*, no. 2641, Herb. Univ. Nanking no. 7569, May 1, 1925 (bush 3 m. high; common); same locality, Tien tai shan, alt. 1260 m., *R. C. Ching*, no. 2815, June 28, 1925 (slender bush, 6 m. tall; common); same locality, Hsia ken, alt. 300 m., *A. N. Steward*, no. 1106, Herb. Univ. Nanking no. 5236, April 22, 1924 (bush 1 m. tall; corolla eaten but not the pistil nor stamens); Wang shan, alt. 600 m., *R. C. Ching*, no. 2902, July 5, 1925 (bush 6 m. high); Li shan, northwest Chemen, exposed rocky ridges, alt. 1260 m., *R. C. Ching*, no. 3111, August 5, 1925 (bush 2 m. high; rare).

Rhododendron Mariesii Hemsley & Wilson in Kew Bull. Misc. Inform. 1907, p. 244.—Hutchinson in Bot. Mag. CXXXIV. t. 8206 (1908).—Wilson in Wilson & Rehder, Monog. Azal. 80 (1921), where complete references and synonymy and a full account of the species are given.

Wang shan, woods, alt. 600 to 900 m., *R. C. Ching*, nos. 2903, 3063, July 5, 20, 1925 (bush 6 m. high; common); Chu wha shan, Chi yuen sze, alt. 1000 m., *A. N. Steward*, no. 1133, Herb. Univ. Nanking no. 5262, April 24, 1924 (bush 2 m. high; flowers pink to lavender).

Rhododendron molle G. Don, Gen. Syst. III. 846 (1834).—Wilson in Wilson & Rehder, Monog. Azal. 95 (1921), where complete references and synonymy and a full account of the species are given.

Azalea mollis Blume, Cat. Gewass. Buitenz. 44 (1823).
Azalea sinensis Loddiges, Bot. Cab. IX. t. 885 (1824).
Rhododendron sinense Sweet, Brit. Flow. Gard. ser. 1, III. sub t. 290 (1829).

Chu hwa shan, open brushy hillslopes, *R. C. Ching*, no. 2642, Herb. Univ. Nanking no. 7570, May 1, 1925 (bush 1 m. high, flowers brownish yellow; common); same locality, Hsia ken, alt. 300 m., *A. N. Steward*, no. 1103, Herb. Univ. Nanking no. 5233, April 22, 1924 (bush 1 m. high; flowers orange-yellow, not fragrant).

Vaccinium Donianum Wight, Icon. t. 1191 (1850). Rehder & Wilson in Sargent, Pl. Wilson. I. 557 (1913).

Vaccinium mandarinorum Diels in Bot. Jahrb. XXIX. 516 (1900).

Chu hwa shan, cliffs, alt. 650 m., *R. C. Ching*, nos. 2687 (Herb. Univ. Nanking no. 7615) and 2782, May 2 and June 27, 1925 (bush 6 m. tall; comparatively rare); Chemen, alt. 330 m., *R. C. Ching*, no. 3133, August 5, 1925 (bush 3 m. high; common); Wang shan, above Tiao chiao, alt. 900 m., *A. N. Steward*, no. 1251, Herb. Univ. Nanking no. 5490, August 9, 1924 (bush 1 to 2 m. high); Wu yuan, *K. Ling*, no. 1344, Herb. Univ. Nanking no. 7877, August 25, 1924.

A common and variable evergreen plant distinguished from related

species by its glabrous brown ovoid winter-buds with acuminate or apiculate bud-scales free and often spreading at the apex.

Vaccinium bracteatum Thunberg, Fl. Jap. 156 (1784).—Shirasawa, Icon. Ess. For. Jap. II. t. 61, fig. 11–22 (1908).—Rehder & Wilson in Sargent, Pl. Wilson. I. 558 (1913).

Andromeda chinensis Loddiges, Bot. Cab. XVII. t. 1648 (1830).
Vaccinium chinense Champion in Hooker's Kew Jour. Bot. IV. 297 1852).
Vaccinium Donianum var. *elliptica* Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 161 (1865–1866).
Vaccinium Oldhami Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 161 (1865-1866).

Chu hwa shan, Wang si che, thickets, 600 m., *R. C. Ching*, no. 2867, June 30, 1925 (bush 3 m. high; rare); without precise locality, *R. C. Ching*, no. 2516, in 1925; Wu yuan, *K. Ling*, no. 1323, Herb. Univ. Nanking no. 7861, August 24, 1924.

The globose, pubescent or puberulous winter-buds serve to distinguish this evergreen species from the related *V. Donianum* Wight. In K. Ling's specimen the bracts below the pedicles are reduced to minute scales, a condition not uncommon in the species.

Vaccinium japonicum var. **sinicum** Rehder in Jour. Arnold Arb. v. 56 (1924).

Vaccinium japonicum Hemsley in Jour. Linn. Soc. XXVI. 16 (1889).—Rehder & Wilson in Sargent, Pl. Wilson. I. 562 (1913).—Non Miquel.
Oxycoccoides japonicus var. *sinica* Nakai, Trees Shrubs Jap. I. 168 (1922).

Wang shan, alt. 600 m., *R. C. Ching*, no. 2931, July 11, 1925 (occasionally seen as undergrowth); same locality, *N. K. Ip*, no. 1190, Herb. Univ. Nanking no. 9627, August 11, 1924.

Vaccinium spec.

Wang shan, thickets, alt. 1500 m., *R. C. Ching*, no. 3039, July 17, 1925 (bush 4 m. high; rare).

This specimen possibly represents a new species closely related to *V. Henryi* Hemsl. from which it differs in its larger, oblong-lanceolate, acuminate, membranous leaves with prominent venation and in its longer pedicels. However, the material in this herbarium of Hemsley's species is limited and after all Ching's specimen may belong there.

MYRSINACEAE

Determined by ALFRED REHDER

Maesa japonica Moritzi apud Zollinger, Syst. Verz. Ind. Archip. 61 (1855).—Mez in Engler, Pflanzenr. IV.–236, p. 50, fig. 6 (1902).—Chung in Mem. Sci. Soc. China I. 204 (Cat. Trees Shrubs China) (1924).

Li kan, west Chemen, alt. 75 m., *R. C. Ching*, no. 3151, August 7, 1925 (slender shrub 1 m. tall); without precise locality (ex Chung, l. c.).

Ardisia crispa A. De Candolle in Trans. Linn. Soc. XVII. 124 (1834); in De Candolle, Prodr. VIII. 134 (1844).—Mez in Engler, Pflanzenr. IV.-236, p. 144, fig. 22 (1902).

Ardisia crenata Roxburgh, Hort. Beng. 85 (1814), nomen nudum; Fl. Ind. ed. Carey, II, 276 (1824).—Sims in Bot. Mag. XLV. t. 1950 (1818).

Wu yen, *K. Ling*, no. 1314, Herb. Univ. Nanking, no. 7852, August 23, 1924; Chu hwa shan, *R. C. Ching*, nos. 2656 (Herb. Univ. Nanking no. 7584) and 2695, May 1 and 2, 1925 (shrub 0.35–1.25 m. tall); Wang shan, alt. 550 m., *R. C. Ching*, no. 2945, July 12, 1925 (shrub 0.6 m. tall); south Siumin, alt. 300 m., *R. C. Ching*, no. 3328, September 7, 1925 (shrub 5.5 m. tall, stem 20 cm. diam.).

EBENACEAE

Determined by ALFRED REHDER

Diospyros Lotus Linnaeus, Sp. 1057 (1753).—Shirasawa, Icon. Ess. For. Jap. I. 123, t. 79 (1900).

Suchow fu, *S. N. Lei*, Herb. Univ. Nanking no. 2987, September 23, 1922; Nan hsu chow, San pou ten, *S. N. Lei*, Herb. Univ. Nanking nos. 2978, 2988, 2994, 2991 and 2993, September 20, 1922; Wang shan, *K. Ling*, no. 1227, Herb. Univ. Nanking no. 7784, August 12, 1924; south Wu yuan, alt. 600 m., *R. C. Ching*, no. 3310, September 4, 1925 (tree 14 m. tall).

Diospyros kaki L. f. var. **sylvestris** Makino in Tokyo Bot. Mag. XXII. 159 (1908).—Rehder & Wilson in Sargent, Pl. Wilson. II. 590 (1916).

Kimen hsien, alt. 500 m., *N. K. Ip*, Herb. Univ. Nanking no. 4775, August 18, 1923 (tree 4.5 m. tall); Wu yuan, *K. Ling*, no. 1336, Herb. Univ. Nanking no. 7872, August 24, 1924 (tree 13 m. tall, trunk 12 cm. diam.); Wang shan, Wu yuan, *K. Ling*, no. 1336, Herb. Univ. Nanking no. 9626, August 24, 1924 (tree 12 m. tall, trunk 15 cm. diam.); on the way to Chu hwa shan, exposed cliff, alt. 250 m., *R. C. Ching*, no. 2747, June 25, 1925 (small tree); west Chemen, alt. 90 m., *R. C. Ching*, no. 3185, August 1925 (tree 15 m. tall, trunk 35 cm. diam., with gray rough bark).

STYRACACEAE

Determined by ALFRED REHDER

Pterostyrax corymbosus Siebold & Zuccarini, Fl. Jap. I. 96, t. 47 (1835).—Perkins in Engler, Pflanzenr. IV. 241, p. 100, fig. 17 (1907).

Chu hwa shan, Tien tai shan, alt. 1175 m., *R. C. Ching*, no. 2859, June 29, 1925 (tree 12 m. tall, trunk 30 cm. diam., with gray rough bark); south side of Wang shan, alt. 1225 m., *R. C. Ching*, no. 3069, July 20, 1925 (tree 14 m. tall, trunk 25 cm. diam.).

Styrax dasyanthus Perkins in Bot. Jahrb. XXXI. 485 (1902); in Engler, Pflanzenr. IV. 241, p. 31 (1907).

Chuchow, Herb. Univ. Nanking no. 1718, May 4, 1920; Chuchow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking no. 2312, June 14, 1922; Wu yuan, alt. 425 m., *N. K. Ip*, no. 69, Herb. Univ. Nanking no. 7687, August 20, 1924 (tree 6 m. tall); Kimen, alt. 375 m., *N. K. Ip*, no. 39, Herb. Univ. Nanking no. 7664, August 19, 1924 (tree 3 m. tall); Shu ling hsien, *K. Ling*, no. 1290, Herb. Univ. Nanking no. 7131, August 20, 1924;

Wang si che, south Chu hwa shan, alt. 550 m., *R. C. Ching*, no. 2866, June 30, 1925 (slender shrub 3 m. tall); Wang shan, alt. 550 m., *R. C. Ching*, no. 2911, July 5, 1925 (tree 9 m. tall, trunk 15 cm. diam., with gray smooth bark).

Styrax philadelphoides Perkins in Engler, Pflanzenr. IV.–241, p. 32 (1907).

Wang shan, *N. K. Ip*, Herb. Nanking no. 5124, August 28, 1923; same locality, alt. 600 m., *R. C. Ching*, no. 3053, July 20, 1925 (shrub 8 m. tall).

Styrax Faberi Perkins in Engler, Pflanzenr. IV.–241, p. 33 (1907).

Chu hwa shan, *R. C. Ching*, no. 2670, Herb. Univ. Nanking no. 7598, May 2, 1925 (shrub 3 m. tall).

Styrax suberifolius Hooker & Arnott, Bot. Voy. Beechey, 196, t. 40 (1841).—Perkins in Engler, Pflanzenr. IV.–241, p. 60 (1907).

Kimen hsien, *K. Ling*, no. 1286, Herb. Univ. Nanking no. 7827, August 19, 1924 (tree 14 m. tall); Wu yuan, alt. 125 m., *R. C. Ching*, no. 3278, August 24, 1925 (tree 20 m. tall, trunk 55 cm., diam., with dark gray smooth bark).

Styrax japonicus Siebold & Zuccarini, Fl. Jap. I. 53, t. 23 (1835).—Perkins in Engler, Pflanzenr. IV.–241, p. 73 (1907).

Styrax serrulatum Hooker f. in Bot. Mag. XCVIII. t. 5950 (1872).—Non Roxburgh.

Wu yuan, alt. 250 m., *R. C. Ching*, no. 3273, August 21, 1925 (slender shrub 3 m. tall).

Styrax obassia Siebold & Zuccarini, Fl. Jap. I. 93, t. 46 (1835).—Hooker f. in Bot. Mag. CXV. t. 7039 (1889).—Perkins in Engler, Pflanzenr. IV.–241, p. 77 (1907).

Wu yuan, alt. 1150 m., *R. C. Ching*, no. 3253, August 18, 1925 (tree 15 m. tall, trunk 30 cm. diam., with dark gray smooth bark).

Alniphyllum Fortunei Perkins in Engler, Pflanzenr. IV.–241, p. 91, fig. 14 (1907).

Halesia Fortunei Hemsley in Jour. Linn. Soc. XXVI. 75 (1889).

Kimen hsien, *K. Ling*, no. 1277, Herb. Univ. Nanking no. 7819, August 19, 1924 (tree 13 m. tall, trunk 20 cm. diam.); Li shan, northwest Chemen, alt. 140 m., *R. C. Ching*, no. 3105, August 3, 1925 (tree 18 m. tall, trunk 35 cm. diam., bark dark gray).

SYMPLOCACEAE

Determined by ALFRED REHDER

Symplocos setchuensis Brand in Bot. Jahrb. XXIX. 528 (1900); in Engler, Pflanzenr. IV.–242, p. 31 (1901).

Li shan, Chemen, alt. 1150 m., *R. C. Ching*, no. 3114, August 5, 1925 (tree-like shrub 12 m. tall).

The specimen consists of a fruiting branch with oblong fruits 11 mm. long and 6 mm. thick, apparently fully grown, but not quite mature and

like the sepals perfectly glabrous. From the type it differs in its narrower leaves scarcely serrulate but only obsoletely crenate; it agrees much better with specimens from Ningpo collected by Maegregor which I had referred before to *S. setchuensis*.

Symplocos paniculata [Wallich ex D. Don, Prodr. Fl. Nepal. 145 (1825), pro synon.; Cat. no. 4429 (1830), nom. nudum.]—Miquel in Ann. Mus. Bot. Lugd.-Bat. III. 102 (1867); Prol. Fl. Jap. 266 (1867).

Symplocos crataegoides Hamilton apud D. Don, Prodr. Fl. Nepal. 145 (1825).—Brand in Engler, Pflanzenr. IV. 242, p. 33 (1901).—Shirasawa, Icon. Ess. For. Jap. II. t. 68, fig. 1–13 (1908).

Chuchow, Herb. Univ. Nanking no. 622, May 4, 1920; Ching yang hsien, alt. 200 m., *A. N. Steward*, no. 1236, Herb. Univ. Nanking no. 5476, August 5, 1924 (tree 8 m. tall, trunk 15 cm. diam.); Chu hwa shan, *R. C. Ching*, no. 2696, Herb. Univ. Nanking no. 7624, May 2, 1925 (shrub 1.75 m. tall); Chu hwa shan, Tien tai shan, *R. C. Ching*, no. 2791, June 28, 1925 (tree 8 m. tall, with dark gray rough bark).

Usually Wallich is quoted as the author of *S. paniculata*, but his name appears in Don's Prodromus only as a synonym and in Wallich's Catalogue as a nomen nudum, though having been mentioned already as a synonym under another name, it is not an absolute nomen nudum. If, however, it is not considered a nomen nudum, it must be considered a "nomen abortivum," for the species had already a properly published name, namely *Symplocos crataegoides* Ham., which cannot be replaced by a synonym published under it, for this was what Wallich was doing, since he had no knowledge of *Prunus paniculata* Thunb. The fact that he had selected the same specific name is only a coincidence, and perhaps not such a strange coincidence as a species of Symplocos with a paniculate inflorescence was a departure from the character of the genus as Wallich knew it. Miquel was the first to publish the combination *S. paniculata* based on the oldest name of the species which is *Prunus paniculata* Thunb.

Symplocos chinensis "(Lour.) Desv. in hb. Mus. Paris" Merrill, Comment. Loureiro Fl. Cochin. (1921).

Myrtus chinensis Loureiro, Fl. Cochin. 313 (1790).
Symplocos sinica Ker in Bot. Reg. IX. t. 710 (1832). Brand in Engler, Pflanzenr. IV.–242, p 31, (1901).

Chu hwa shan, *R. C. Ching*, no. 2703, Herb. Univ. Nanking no. 7630, May 2, 1925 (shrub 2 m. tall).

Symplocos lancifolia Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. II. 133 (Fam. Nat. Fl. Jap. I. 9) (1845).—Brand in Engler, Pflanzenr. IV. 242, p. 41 (1901).

Wu yuan, alt. 450 m., *N. K. Ip*, no. 75, *K. Ling*, no. 1304, Herb. Univ. Nanking nos. 7691, 7843, August 22, 1924 (tree 7 m. tall, trunk 10 cm. diam.).

Symplocos anomala Brand in Bot. Jahrb. XXIX. 529 (1900); in Engler, Pflanzenr. IV. 242, p. 67 (1901).

Wang shan, *K. Ling*, no. 1225, Herb. Univ. Nanking no. 7783, August 12, 1924 (tree 3 m. tall); same locality, alt. 600–700 m., *R. C. Ching*, nos. 2972 and 3066, July 12 and 20, 1925 (shrub 6–7 m. tall); without precise locality, *R. C. Ching*, no. 3258, in 1925.

Symplocos stellaris Brand in Bot. Jahrb. XXIX. 528 (1900); in Engler Pflanzenr. IV.–242, p. 68 (1901).

Wang shan, alt. 1300 m., *A. N. Steward*, no. 1283 and *K. Ling*, no. 1195, Herb. Univ. Nanking nos. 7155 and 7759, August 11, 1924; same locality, *R. C. Ching*, no. 2920, July 5, 1925 (tree 6 m. tall).

OLEACEAE

Determined by ALFRED REHDER

Fontanesia Fortunei Carrière in Rev. Hort. 1859, p. 43, fig. 9.—Schneider, Ill. Handb. Laubholzk. II. 809, fig. 511 a–d (1912).

Fontanesia phillyreoides Labill. var. *sinensis* Debaux in Act. Soc. Linn. Bordeaux, XXX. 93 (Fl. Shanghai, 41) (1875).

Fontanesia phillyreoides var. *Carrierei* Koehne, Deutsch. Dendr. 505 (1893).—Lingelsheim in Engler, Pflanzenr. IV–243, 9, fig. 1 C, D (1920).

Wang shan, *R. C. Ching*, no. 2924, July 5, 1925 (shrub 8 m. tall); Wu yuan, alt. 1000 m., *R. C. Ching*, no. 3302, September 2, 1925 (tree 14 m. tall).

Fraxinus chinensis Roxburgh, Fl. Ind. I. 150 (1820).—Hemsley in Jour. Linn. Soc. Bot. XXVI. 85 (1889).—Lingelsheim in Engler, Pflanzenr. IV.–243, p. 28 (1920).

Fraxinus chinensis var. α. *typica* Lingelsheim, l. c. fig. 8 A, B (1920).

Kau toun, Tai ping hsien, *R. C. Ching*, no. 2884, July 3, 1925 (shrub 8 m. tall); west Chemen, alt. 90 m., *R. C. Ching*, no. 3193, August 9, 1925 (small tree); Tung cheng hsien, Nganching fu, *B. C. G. Scott*, about 1880 (ex Hemsley, l. c.).

Fraxinus chinensis var. ε. **acuminata** Lingelsheim in Engler, Pflanzenr. IV.–243, p. 30 (1920).

Wang shan, *K. Ling*, no. 1153, Herb. Univ. Nanking no. 7733, August 9, 1924 (tree 5 m. tall); same locality, alt. 600–1200 m., *R. C. Ching*, nos. 2941 and 3071, July 11 and 20, 1925 (tree 8–9 m. tall, diam. of trunk 15–20 cm.); Chu hwa shan, Tien tai shan, alt. 1200 m., *R. C. Ching*, nos. 2818, 2854, June 28 and 29, 1925 (shrub 8 m. or tree 20 m. tall).

Fraxinus spec.

Li kan, Chemen, alt. 90 m., *R. C. Ching*, no. 3152, August 7, 1925 (shrub 5 m. tall).

This specimen I am unable to identify with any Chinese species. It is similar in general appearance to *F. chinensis* Rox. and *F. longicuspis* Sieb. & Zucc. The young branchlets, the inflorescence and the midrib and veins on the under side of the leaves are rather densely short-pilose, the upper side of the leaves is slightly puberulous and the under side sparingly pubescent between the veins; the minute calyx is deeply

parted as in *F. longicuspis* or mostly fallen off, not campanulate as in *F. chinensis*. The fruit is oblong-spatulate about 3 cm. long and 6–7 mm. broad. This Ash is apparently a new species, but without flowers I hesitate to describe it as such.

Forsythia viridissima Lindley in Jour. Hort. Soc. I. 226 (1846); in Bot. Reg. I. t. 39 (1847). —Hooker in Bot. Mag. LXXVII. t. 4587 (1851).—Lingelsheim in Engler, Pflanzenr. IV.-243, p. 110 (1920).

Chu hwa shan, Chi yuen sze, alt. 1000 m., *A. N. Steward*, no. 1138, Herb. Univ. Nanking no. 5267, April 24, 1924 (shrub 1 m. tall); Chu hwa shan, on exposed rocky cliffs, *R. C. Ching*, no. 2618, Herb. Univ. Nanking no. 7544, April 29, 1925 (shrub 1.75 m. tall).

Ligustrum sinense, Loureiro, Fl. Cochin. 19 (1790).—Decaisne in Nouv. Arch. Mus. Paris, sér. 2, II. 36 (Monog. Ligustrum et Syringa) (1878).[1]—Höfker in Mitt. Deutsch. Dendr. Ges. XXIV. 57, t. 1, 2 (1815).

Ching yang hsien, at foot of mountain, *K. Ling*, no. 1123, Herb. Univ. Nanking no. 7714, August 6, 1924 (shrub 1 m. tall); Shu ling hsien, alt. 400 m., *K. Ling*, no. 1287, Herb. Univ. Nanking no. 7828, August 19, 1924 (shrub 3 m. tall); Wu yuan, alt. 600 m., *R. C. Ching*, no. 3257, August 18, 1925 (shrub 5 m. tall).

Ligustrum Quihoui Carrière in Rev. Hort. 1869, p. 377.—Decaisne in Nouv. Arch. Mus. Paris, sér. 2, II. 35 (Monog. Ligustrum et Syringa) (1878).—Schneider, Ill. Handb. Laubholzk. II. 801, fig. 502, k l (1911).

Without precise locality, *R. C. Ching*, no. 2733, in 1925.

Ligustrum lucidum Aiton, Hort. Kew. ed. 2, I. 19 (1810).—Sims in Bot. Mag. LII. t. 2565 (1825).—Decaisne in Nouv. Arch. Mus. Paris, sér. 2, II. 20 (Monog. Ligustrum et Syringa) (1878).—Hemsley in Jour. Linn. Soc. Bot. XXVI. 92 (1889).

Wang shan, alt. 350 m., *R. C. Ching*, no. 2895, July 5, 1925 (tree 11 m. tall); Wu yuan, *R. C. Ching*, no. 3282, August 29, 1925 (tree 18 m. tall); Tung cheng hsien, Nganching fu, *B. C. G. Scott*, about 1880 (ex Hemsley, l. c.).

Ligustrum acutissimum Koehne in Urban & others, Festschrift Siebz. Geburtst. Ascherson, 192, fig. 1a (1904). —Schneider, Ill. Handb. Laubholzk. II. 806, fig. 505 m n^2, 506a d (1911).

Li shan, northwest Chemen, *R. C. Ching*, no. 3113, August 5, 1925 (shrub 6 m. tall).

This specimen which is in young fruit represents apparently a glabrescent or glabrous form of *L. acutissimum*, but as long as the flowers are unknown this identification remains somewhat doubtful.

Ligustrum sp.

Foot of Chu hwa shan, *R. C. Ching*, no. 2690, Herb. Univ. Nanking

[1] The first part of vol. II. of the Nouvelles Archives came out in 1879 according to the cover page of that part, but the paper was issued as a separate in 1878 according to Revue bibliographique in Jour. Soc. Bot. France, XXVI. 103.

no. 7618, May 2, 1925 (shrub 6 m. tall); Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2797, June 28, 1925 (shrub 4 m. tall).

These specimens of which the first has young flower buds and a few old fruits and the second very young fruits, belong probably in the affinity of *L. acutissimum* Koehne, but the inflorescence is larger and looser and the fruits on longer and much thickened pedicels. Without flowers a definite identification is not possible.

Ligustrum sp.

Ma chi, Siunin, alt. 90 m., at the shaded foot of rocky cliff, *R. C. Ching*, no. 3212, August 14, 1925.

This is an evergreen or half-evergreen species with coriaceous oblong-lanceolate acuminate leaves up to 5.5 cm. long, the slender acumen ending in a distinct mucro; the branchlets and the midrib on the under side of the leaves at least near base are pilose; the inflorescence which bears young fruits is short and compact. Without flowers I am at a loss where to place this distinct looking Privet.

Osmanthus Cooperi Hemsley in Kew Bull. Misc. Inform. IX. 11, 1896.

Ma chi, Siunin, alt. 300 m., *R. C. Ching*, no. 3213, August 14, 1925 (tree 12 m. tall).

Chionanthus retusa Lindley & Paxton in Paxton's Flow. Gard. III. 85, fig. 273 (1853).—Nakai, Fl. Sylv. Kor. x. 16, t. 1 (1921).

Chu hwa shan, alt. 300 m., *A. N. Steward*, no. 1104, Herb. Univ. Nanking no. 5234, April 22, 1924 (shrub 1 m. tall).

The specimen cited above has finely serrulate leaves, a form which has been distinguished as *C. retusa* var. *serrulata* (Hayata) Koidz. This is apparently only a juvenile form; young plants always have serrulate leaves.

Jasminum lanceolarium Roxburgh, Fl. Ind. I. 97 (1820).—Clarke in Hooker f., Fl. Brit. Ind. III. 601 (1882).

East Wu yuan, alt. 550, *R. C. Ching*, no. 3312, September 4, 1925 (strong climber 15 m. high).

LOGANIACEAE

Determined by ALFRED REHDER

Gardneria multiflora Makino in Tokyo Bot. Mag. VI. 53 (1892), nomen nudum; XV. 103 (1901).—Nakai, Trees Shrubs Japan, I. 317, fig. 176 (1922).

Wang shan, alt. 1350 m., *K. Ling*, no. 1183, Herb. Univ. Nanking no. 7751, August 11, 1924; same locality, alt. 1275 m., *R. C. Ching*, nos. 2955, and 3037, July 12 and 15, 1925 (climbing shrub 3 m. high); Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2809, June 28, 1925 (evergreen climber 8 m. tall).

The plant from central and western China has been separated by Nakai as *Gardneria chinensis*, but the specimens cited above agree with

the Japanese *G. multiflora* in their 1–3-flowered inflorescence, shorter petioles and the more numerous veins of the leaves. Ching's number 1777 from Chekiang agrees in the leaves and petioles with the Anhwei plant, but the inflorescence is 5-flowered.

Buddleia Lindleyana Fortune apud Lindley in Bot. Reg. XXX. misc. not. 25 (1844); XXXII. t. 4 (1846).

Wang shan, *K. Ling*, no. 1248, Herb. Univ. Nanking no. 7796, August 14, 1924; Wu yuan, Tan chuan, *K. Ling*, no. 1319, Herb. Univ. Nanking no. 7857, August 24, 1924; north foot of Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2759, June 26, 1925 (bushy shrub 4 m. tall).

APOCYNACEAE

Determined by ALFRED REHDER

Trachelospermum jasminoides Lemaire in Jard. Fleur. I. t. 61 (1851).

Rhynchospermum jasminoides Lindley in Jour. Hort. Soc. Lond. I. 74, fig. (1846).—Hooker in Bot. Mag. LXXIX. t. 4737 (1853).

Shi teh hsien, *K. Ling*, no. 1130, Herb. Univ. Nanking no. 7719, August 7, 1924; Chu hwa shan, *R. C. Ching*, no. 2667, Herb. Univ. Nanking no. 7595, May 2, 1925 (climber 18 m. high); Wu yuan, alt. 550 m., *R. C. Ching*, no. 3305, September 4, 1925 (climber 12 m. tall).

BORAGINACEAE

Determined by ALFRED REHDER

Ehretia thyrsiflora Nakai, Trees Shrubs Japan, I. 327, fig. 179 (1922); Fl. Sylv. Kor. XIV. 20, t. 4 (1923).

Cordia thyrsiflora Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 150 (Fl. Jap. Fam. Nat. II. 26) (1846).

Shi teh hsien, *K. Ling*, no. 1133, Herb. Univ. Nanking no. 7722, August 7, 1924; Wu yuan, *K. Ling*, no. 1337, Herb. Univ. Nanking no. 7873, August 24, 1924 (tree 12 m. tall, trunk 30 cm. diam; fruit reddish yellow; Pi shan, northwest Chemen, alt. 300 m., *R. C. Ching*, no. 3099, August 3, 1925 (tree 9 m. tall, trunk 40 cm. diam., with dark gray rough bark).

VERBENACEAE

Determined by ALFRED REHDER

Callicarpa dichotoma Raeuschel Nomencl. Bot. ed. 3, p. 37 (1797), nomen nudum.—K. Koch, Deutsch. Dendr. II. 336 (1872).—Nakai, Fl. Sylv. Kor. XIV. 28, t. 5 (1923).

Callicarpa purpurea Jussieu in Ann. Mus. Paris, VII. 69 (1806).

Foot of Chu hwa shan, alt. 350 m., *R. C. Ching*, no. 2766, June 26, 1925 (shrub 1.5 m. tall); west Chemen, *R. C. Ching*, without no., August 1925.

Callicarpa japonica Thunb. var. **angustata** Rehder in Sargent, Pl. Wilson. III. 369 (1916).

Wang shan, *K. Ling*, no. 1189, Herb. Univ. Nanking no. 7754, August

11, 1924; same locality, alt. 1200 m., *R. C. Ching*, no. 2977, July 12, 1925 (much branched shrub 4.5 m. tall).

Callicarpa Giraldiana Hesse in Mitt. Deutsch. Dendr. Ges. XXI. 366, 2 fig. (1912), sine descript.—Rehder in Sargent, Pl. Wilson. III. 366 (1916).

Ching yang hsien, *K. Ling*, no. 1127, Herb. Univ. Nanking no. 7717, August 6, 1924; Wang shan, *K. Ling*, no. 1243, Herb. Univ. Nanking no. 7794, August 14, 1924; same locality, *R. C. Ching*, no. 2990, July 13, 1925 (shrub 4.5 m. tall); north foot of Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2761, June 26, 1925 (shrub 4.5 m. tall); south Chemen, alt. 300 m., *R. C. Ching*, no. 3204, August 13, 1925 (slender shrub 3 m. tall).

None of the specimens cited above represents typical *C. Giraldiana;* Ling's two specimens resemble somewhat *C. japonica* var. *angustata* Rehd. in their narrower leaves, but they are easily distinguished by the broader anthers opening with a longitudinal slit and the quite glabrous leaves; by the same characters Ching's nos. 2761 and 3204 which are similar in their large leaves and large inflorescence to *C. japonica* var. *luxurians* Rehd. can be distinguished from that variety. Ching's no. 2990 which is nearest to typical *C. Giraldiana* in its characters differs in its nearly glabrous leaves which are only slightly and minutely glandular beneath and very slightly stellate-pubescent on the veins.

Callicarpa longipes Dunn in Jour. Linn. Soc. XXXVIII. 363 (1908).

Chang gon shan, Wu yuan, alt. 625 m., *R. C. Ching*, no. 3230, August 16, 1925 (shrub 2 m. tall).

Ching's specimen differs from the type in its less dense and shorter pubescence, and in the smaller flowers, but otherwise it agrees with it.

Callicarpa Lingii Merrill, sp. nov.

Frutex glaber vel subglaber, ramis pallidis, teretibus, glabris, ramulis circiter 2 mm. diametro, teretibus, minute stellato-puberulis, internodiis usque ad 9 cm. longis; foliis chartaceis vel submembranaceis, utrinque glabris vel junioribus supra obscurissime puberulis, brevissime petiolatis vel subsessilibus, oblongis, 15 ad 22 cm. longis, 5 ad 6.5 cm. latis, supra olivaceo-viridibus, subtus paullo pallidioribus, disperse aureo-glandulosis, apice distincte acuminatis, deorsum angustatis, basi circiter 7 mm. latis, abrupte obtusis, margine remote minuteque calloso-denticulatis, nervis primariis utrinque 10 ad 12, distantibus, curvatis, distinctis, laxe arcuato-anastomosantibus, reticulis laxis; petiolo vix 1 mm. longo, parce stellato-puberulo; infructescentiis solitariis, supra-axillaribus, cymosis, circiter 2.5 cm. longis, minute deciduc stellato-puberulis, vix pedunculatis, paullo supra basin ramosis, ramulis pedicellisque brevibus glabris vel subglabris, bracteis lineari-lanceolatis, 1 ad 2 mm. longis; calycibus sub fructu glabris, circiter 3 mm. diametro, leviter undulato crenatis; fructibus late ovoideis vel subobovoideis, glabris, circiter 3 mm. longis,

ANHWEI: Wu Yuan, *K. Ling*, no. 1313, Herb. Univ. Nanking no. 7851, August 23, 1924, in forests.

The alliance of this species is manifestly with *Callicarpa brevipes* Hance from which it is at once distinguished by being nearly glabrous except for the branchlets and the inflorescences, as well as in its much longer glabrous leaves. E. D. MERRILL

Premna microphylla Turczaninow in Bull. Soc. Nat. Moscou, XXXVI. pt. II. 217 (1863).

Premna japonica Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 97 (1865); Prol. Fl. Jap. 29 (1866).—Shirasawa, Icon. Ess. For. Jap. II. t. 70, fig. 1–10 (1908).

On the way to Chu hwa shan, alt. 250 m., *R. C. Ching*, no. 2749, June 25, 1925 (slender shrub 1.5 m. tall); Wang si che, south Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2848, June 29, 1925.

Vitex Negundo Linnaeus, Sp. 638 (1753).—Schauer in De Candolle, Prodr. XI. 684 (1847).—De Wildeman in Hort. Thenens. V. 157, t. 199 (1906).

Chuchow, Herb. Univ. Nanking no. 1726, April 26, 1920.

Vitex cannabifolia Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 152 (Fl. Jap. Fam. Nat. II. 28) (1846).

Wu yuan, alt. 450 m., *K. Ling*, no. 1307, Herb. Univ. Nanking no. 7845, August 22, 1924; Lin chu wan, *R. C. Ching*, no. 2739, June 25, 1925 (bushy shrub 2.5 m. tall).

This species is closely related to *V. Negundo* but is easily distinguished by its short-pilose not tomentulose pubescence and the glabrous or glabrescent mesophyll of the under side of the leaves which is green or greenish not whitish.

Clerodendron foetidum Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 126 (Enum. Pl. Chin. Bor. 52) (1833).—Hooker in Bot. Mag. LXXXI. t. 4880 (1855).

Chu chow, Lang yah sze, *A. N. Steward*, Herb. Univ. Nanking, no. 2305, June 14, 1922; Pi chiao chiao, alt. 250 m., *A. N. Steward*, no. 1239, Herb. Univ. Nanking no. 5479, August 6, 1924 (shrub 0.5 m. tall); Wang si che, south Chu hwa shan, alt. 600 m., *R. C. Ching*, no. 2877, June 30, 1925 (shrub 0.6 m. tall).

Clerodendron trichotomum Thunb. var. **Fargesii** Rehder in Sargent, Pl. Wilson. III. 376 (1916).

Clerodendron Fargesii Dode in Bull. Soc. Dendr. France, 1907, p. 207, fig.—Pinelle in Rev. Hort. 1911, p. 522, fig. 206–207.

Wang shan, *K. Ling*, no. 1209, Herb. Univ. Nanking, no. 7770, August 12, 1924 (tree 6 m. tall, trunk 10 cm. diam.); same locality, alt. 1150 m., *R. C. Ching*, no. 2951, July 12, 1925 (tree 6.5 m. tall, trunk 15 cm. diam., with gray bark); Chang gon shan, Wu yuan, alt. 725 m., *R. C. Ching*, no. 3222, August 16, 1925 (bushy shrub 3 m. tall).

Clerodendron cyrtophyllum Turczaninow in Bull. Soc. Nat. Moscou, XXXVI. pt. III. 222 (1863).

Yeh hsien, alt. 950 m., *R. C. Ching*, no. 3074, July 21, 1925 (shrub 2.5 m. tall).

Caryopteris incana Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 97 (1866); Prol. Fl. Jap. 29 (1866).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXXI. 86 (1886); in Mél. Biol. XII. 523 (1886).

Caryopteris Mastacanthus Schauer in De Candolle, Prodr. XI. 625 (1847).—Hooker f. in Bot. Mag. CIII. t. 6799 (1885).

S che chi, U kan kou, *R. C. Ching*, no. 4677, September 15, 1925 (subshrub 1 m. tall).

This specimen differs from the typical form in the grayish green, only densely pubescent not tomentose under side of the leaves and agrees in this respect with a specimen from Ningpo collected by D. Macgregor.

SOLANACEAE

Determined by ALFRED REHDER

Solanum Dulcamara L. var. **pubescens** Blume, Bijdr. Fl. Ned. Ind. 698 (1825).

Solanum lyratum Thunberg, Fl. Jap. 92 (1784).—Dunal in De Candolle, Prodr. XIII. pt. I. 79 (1852).

Solanum Dulcamara γ *Chinense* Dunal, l. c.

South I hsien, alt. 125 m., *R. C. Ching*, no. 4315, Herb. Univ. Nanking no. 8698, July 31, 1925 (climbing herb. 1.25 m. high).

SCROPHULARIACEAE

Determined by ALFRED REHDER

Paulownia Fortunei Hemsley in Jour. Linn. Soc. XXVI. 180 (1890).

Paulownia Mikado Ito, Icon. Fl. Jap. I. t. 9–12 (1912).

Wu yuan, alt. 250 m., *R. C. Ching*, no. 3286, August 29, 1925 (tree 24 m. tall, trunk 1.80 diam., with grayish brown bark).

BIGNONIACEAE

Determined by ALFRED REHDER

Catalpa ovata G. Don, Gen. Syst. IV. 230 (1837).—Lavalleé, Icon. Arb. Segrez. 33, t. 10 (1880).

Catalpa Kaempferi Siebold & Zuccarini in Abh. Akad. Münch. IV. pt. III. 142 (Fl. Jap. Fam. Nat. II. 18) (1846).—Hooker f. in Bot. Mag. CVIII. t. 6611 (1882).

Tai pin hsien, alt. 150 m., *R. C. Ching*, no. 2887, July 3, 1925 (tree 20 m. tall, trunk 25 cm. diam., with rough gray bark).

GESNERIACEAE

Determined by ALFRED REHDER

Lysionotus pauciflorus Maximowicz in Bull. Acad. Sci. St. Pétersb. IX. 534 (1874); in Mél. Biol. IX. 366 (1874).—C. B. Clarke in De Candolle, Monog. Phaner. V. 599 (1883).

Wang shan, on shaded rocks, *R. C. Ching*, no. 2901, July 5, 1925 (trailing shrub 20 cm. high); Chemen, on rock under wood, *R. C. Ching*, no. 3126, August 5, 1925 (low trailing shrub).

RUBIACEAE

Determined by ALFRED REHDER

Emmenopterys Henryi Oliver in Hooker's Icon. XIX. t. 1823 (1889).

Wang shan, alt. 600 m., *R. C. Ching*, no. 2971, July 12, 1925 (tree 18 m. high).

Adina rubella Hance in Jour. Bot. VI. 114 (1868).—Nakai, Fl. Sylv. Kor. XIV. 86, t. 20 (1923).

Chuchow, alt. 150 m., *A. N. Steward*, no. 1077, Herb. Univ. Nanking no. 5443, October 27, 1923 (shrub 0.5–1 m. high); north foot of Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2757, June 26, 1925 (a dense, much branched, bushy shrub 20 cm. high).

Adina pilulifera Franchet in Jour. Bot. IX. 207 (1895).

Cephalanthus pilulifera Lamarck, Enc. Méth. I. 678 (1785).

Adina globiflora Salisbury in Hooker, Parad. Lond. II. t. 115 (1807).

Wu yuan, *K. Ling*, no. 1332, Herb. Univ. Nanking no. 7868, August 24, 1924 (shrub 5 m. high); same locality, alt. 120 m., *R. C. Ching*, no. 3268, August 21, 1925 (bushy shrub 3 m. high).

Cephalanthus occidentalis Linnaeus, Sp. 95 (1753).—Sargent, Silva N. Am. XIV. t. 711 (1902).

Li shan, northwest Chemen, alt. 180 m., *R. C. Ching*, no. 3103, August 3, 1925 (tree of medium size 14 m. high).

Mussaenda Wilsonii Hutchinson in Sargent, Pl. Wilson. III. 393 (1917).

Kimen, alt. 360 m., *N. K. Ip*, no. 41, Herb. Univ. Nanking no. 7666, August 19, 1924; same locality and date; *K. Ling*, no. 1276, Herb. Univ. Nanking no. 7818 (shrub); Chemen, *R. C. Ching*, no. 3199, August 13, 1925 (a shrub 2.5 m. high).

Gardenia augusta Merrill, Interpr. Rumph. Herb. Amboin. 485 (1917).

Gardenia florida Linnaeus, Sp. ed. 2, 305 (1762).

Kimen, *K. Ling*, no. 1270, Herb. Univ. Nanking no. 7814, August 18, 1924; Li kan, west of Chemen, alt. 75 m., *R. C. Ching*, no. 3150, August 7, 1925 (a bushy shrub 2 m. high).

Paederia chinensis Hance in Jour. Bot. XVI. 228 (1878).—Nakai, Fl. Sylv. Kor. XIV. 91, t. 21 (1923).

Paederia tomentosa Hemsley in Jour. Linn. Soc. XXIII. 389 (1888), pro parte.—Non Blume.

Tze kuan Sze, Wang shan, alt. 1300 m. alt., *A. N. Steward*, no. 1281. Herb. Univ. Nanking no. 7153, August 11, 1924; Chu hwa shan, alt. 750 m., *R. C. Ching*, no. 2837, June 28, 1925 (climber 6 m. high); west Siunin, alt. 300 m., *R. C. Ching*, no. 3261, in 1925 (winding dense climber; 12 m. high).

Serissa serissoides Druce in Rep. Bot. Exch. Club Brit. Isles, 1916, p. 646 (1917).

Democritea serissoides De Candolle, Prodr. IV. 540 (1830).

Leptodermis nervosa Hutchinson in Sargent, Pl. Wilson. III. 404 (1916).

Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2755, June 25, 1925 (dense,

bushy shrub ¾ m. high); south side of Wang shan, alt. 810 m., *R. C. Ching*, no. 3062, July 20, 1925 (shrub ½ m. high).

CAPRIFOLIACEAE

Determined by ALFRED REHDER

Sambucus javanica Reinwardt apud Blume, Bijdr. Fl. Ned. Ind. 657 (1825).—Without precise locality, *R. C. Ching*, no. 4310, in 1925.

Viburnum sympodiale Graebner in Bot. Jahrb. XXIX. 587 (1901).—Rehder in Sargent, Trees & Shrubs II. 83, t. 139 (1908).

Wang shan, alt. 1500 m., *K. Ling*, no. 1201, Herb. Univ. Nanking no. 7764, August 12, 1924; same locality, alt. 750 m., *R. C. Ching*, 2962, July 12, 1925 (shrub 5 m. tall).

Viburnum tomentosum Thunberg, Fl. Jap. 123 (1874).—Shirasawa, Icon. Ess. For. Jap. I. 131, t. 86, fig. 1–16 (1900).

Chu hwa shan, *R. C. Ching*, no. 2660, Herb. Univ. Nanking no. 7588, May 1, 1925; Tien tai shan, Chu hwa shan, alt. 1200 m., *R. C. Ching*, no. 2856, June 29, 1925 (shrub 4 m. high); Ye Hsien, alt. 360 m., *R. C. Ching*, no. 3073, July 21, 1925 (low shrub 1–2 m. high).

Viburnum macrocephalum Fortune sensu Maximowicz in Bull. Soc. Nat. Moscou, LIV. 24 (1879).—Rehder in Sargent, Trees & Shrubs, II. 110 (1908).

Viburnum Keteleeri Carrière in Rev. Hort. 1863, p. 269, fig. 31.
Viburnum macrocephalum var. *Keteleeri* Nicholson, Ill. Dict. Gard. IV. 155, fig. 168 (1889).

Kweichow, alt. 150 m., *R. C. Ching*, no. 3339, September 10, 1925 (shrub 6 m. tall).

Viburnum theiferum Rehder in Sargent, Trees & Shrubs, II. 43, t. 121 (1907).

Kimen, alt. 360 m., *N. K. Ip*, no. 36, Herb. Univ. Nanking no. 7662, August 19, 1924; Chu hwa shan, alt. 500 m., *A. N. Steward*, no. 1120, Herb. Univ. Nanking no. 5249, April 23, 1924 (shrub 2 m. tall); same locality, *R. C. Ching*, no. 2644, Herb. Univ. Nanking no. 7572, May 1, 1925 (shrub 1.75 m. tall); same locality, alt. 600 m., *R. C. Ching*, no. 2780, June 27, 1925 (shrub of umbrella shape 3 m. tall).

Viburnum Wrightii Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 267 (1865–6).—Rehder in Sargent, Trees & Shrubs, I. 37, t. 19, (1902).

Wang shan, alt. 1155 m., *R. C. Ching*, no. 2998, July 13, 1925 (shrub 5 m. tall); Chang gon shan, Wu yuan, alt. 750 m., *R. C. Ching*, no. 3245, August 17, 1925 (shrub 3½ m. tall).

Differs from *V. lobophyllum* Graebner in the estipulate petioles, in the longer filaments and in the generally elliptic or obovate leaves. No. 3245 has densely pilose ovaries, probably caused by a gall insect.

Viburnum Fordiae Hance in Jour. Bot. XXI. 321 (1883).

Wu yuan, alt. 120 m., *R. C. Ching*, no. 3279, August 24, 1925 (shrub 4.5 m. high).

Ching's no. 3279 is doubtfully referred to this species.

Viburnum ichangense Rehder in Sargent, Trees & Shrubs II. 105, t. 150 (1908).

Viburnum erosum var. *ichangense* Hemsley in Jour. Linn. Soc. Bot. XXIII. 352 (1888).

Wang shan, *K. Ling*, no. 1236, Herb. Univ. Nanking no. 7790, August 12, 1924; same locality, alt. 1050 m., *R. C. Ching*, no. 2952, July 12, 1925 (shrub 4.5 m. tall); Tien tai shan, Chu hwa shan, *R. C. Ching*, no. 2826, June 28, 1925 (erect shrub 3 m. tall).

Viburnum Sargentii Koehne var. **calvescens** Rehder in Mitt. Deutsch. Dendr. Ges. XII. 125 (1903).

Wang shan, alt. 1340 m., *R. C. Ching*, no. 3050, July 19, 1925 (shrub 4.5 high).

Abelia Zanderi Rehder in Sargent, Pl. Wilson. I. 121 (1911).

Linnaea Zanderi Graebner in Bot. Jahrb. XXIX. 132 (1900).

Near Sz Tz Lin, Wang shan, alt. 2000 m., *A. N. Steward*, no. 1310, Herb. Univ. Nanking no. 7181, August 11, 1924 (shrub 2 m. tall); Wang shan, alt. 1900 m., *K. Ling*, no. 1204, Herb. Univ. Nanking no. 7765, August 12, 1924; same locality, alt. 900 m., *R. C. Ching*, no. 2959, July 12, 1925 (dense spreading shrub 1–1.5 m. tall) same locality, alt. 1490 m., *R. C. Ching*, no. 3015, July 15, 1925 (dense shrub 3 m. tall); Tien tai shan, Chu hwa shan, *R. C. Ching*, no. 2833, June 28, 1925 (dense globular shrub, up to 1 m. tall).

Lonicera fragrantissima Lindley & Paxton, Flow. Gard. III. 75, fig. 268 (1852). Boynton in Addisonia X. 41, t. 341 (1925).

Chu hwa shan, *R. C. Ching*, no. 2645, Herb. Univ. Nanking no. 7573, May 1, 1925 (shrub of bushy form 3.5 m. tall).

Form with pubescent leaves.

Lonicera Hemsleyana Rehder in Rep. Mo. Bot. Gard. XIV. 112 (Syn. Lonicera) (1903).

Tien tai shan, Chu hwa shan, alt. 1200 m., *A. N. Steward*, no. 1156, Herb. Univ. Nanking no. 5280, April 25, 1924 (bush 1–2 m. tall).

Lonicera modesta Rehder in Sargent, Trees & Shrubs II. 49 (1907).

Chu hwa shan, alt. 1300 m., *K. Ling*, no. 2036, Herb. Univ. Nanking no. 7296, April 25, 1924 (shrub 2 m. tall); same locality, *R. C. Ching*, no. 2689, Herb. Univ. Nanking no. 7617, May 2, 1925 (shrub 3.5 m. tall).

Lonicera spec.

Wang shan, alt. 1370 m., *R. C. Ching*, no. 3007, July 15, 1925 (dense shrub 1 m. tall).

This specimen is in immature fruit and too incomplete for final determination; it belongs to the section Rhodanthae and in its general appearance it looks like *L. modesta* var. *kulingensis*, but the young fruits agree with those of *L. Graebneri* Rehd., except that bracts and sepals are glabrous.

Lonicera Maackii Maximowicz var. **podocarpa** Franchet apud Rehder in Rep. Mo. Bot. Gard. XIV. 141 (1903).

Chu hwa shan, *R. C. Ching*, no. 2715, Herb. Univ. Nanking no. 7579, May 3, 1925 (shrub 5 m. high).

Lonicera Henryi Hemsley in Jour. Linn. Soc. XXIII. 363 (1888).—Craib in Bot. Mag. CXXXVII. t. 8375 (1911).

Chang gon shan, Wu yuan, alt. 750 m., *R. C. Ching*, no. 3247, August 17, 1925 (a strong climber 12 m. high).

Lonicera Henryi var. **trichosepala** Rehder, var. nov.

A typo recedit ramulis junioribus dense patenti-pilosis, foliis subtus ad costam et sparsius ad venas et saepe ad venulas setoso-pilosis, supra costa excepta glabratis vel laxe accumbenti-pilosis, bracteis longioribus ut bracteolae et sepala lineari-lanceolata ovarium subaequantia satis dense setoso-pilosis et setoso-ciliatis.

ANHWEI: Chu hwa shan, alt. 600 m., in partially shaded ravines, *R. C. Ching*, no. 2807, June 28, 1925 (small climbing shrub; type).

CHEKIANG: Tien moo shan, side of streams, *R. C. Ching*, no. 5049, August 18, 1924 (shrub).

This variety of which the flowers are unknown, differs chiefly in the spreading pubescence of the branchlets, glabrous or covered with more or less appressed pubescence in the typical form, and in the much longer linear-lanceolate densely setose-pilose sepals, triangular-ovate and glabrous or occasionally with a few setae on the margin in the type.

Lonicera tragophylla Hemsley in Jour. Linn. Soc. XXIII. 367 (1888).—Rehder in Sargent, Trees & Shrubs I. 91, t. 46 (1903).

Wang shan, alt. 1050 m., *R. C. Ching*, no. 2956, July 12, 1925 (woody climber 10 m. high); same locality, *R. C. Ching*, no. 2985, July 12, 1925 (a tall strong climber 14 m. high).

Diervilla japonica DC. var. **sinica** Rehder in Mitt. Deutsch. Dendr. Ges. XXII. 264 (1913).

Chu hwa shan, alt. 1300 m., *K. Ling*, no. 2059, Herb. Univ. Nanking no. 7297, April 25, 1924 (shrub or bush 2 m. high); same locality, *R. C. Ching*, no. 2672, Herb. Univ. Nanking no. 7600, May 2, 1925; same locality, northern foot, alt. 360 m., *R. C. Ching*, no. 2765 (B), June 26, 1925.

The specimens cited differ from the type of the variety in the less pubescent leaves and the nearly glabrous ovary.

ADDITION

Page 126 under **Prunus perulata** add:

Chu hwa shan, alt. 800 m., *K. Ling*, no. 2065, Herb. Univ. Nanking no. 7298, April 25, 1924 (tree 13 m. tall, trunk 25 cm. diam.).

NOTES

The Arnold Arboretum Expedition to North Central Asia.—Friends of the Arnold Arboretum and of Mr. J. F. Rock will be glad to learn of the safe arrival of the Expedition at Shanghai. News is just to hand that all the collections have arrived in good order and are being sent forward. Mr. Rock sailed for San Francisco on the S. S. President Madison on August 5th. Much anxiety has been felt for the safety of Mr. Rock and the Expedition and its successful termination is a welcome and happy relief to all concerned. The only regret is that Professor C. S. Sargent did not live to learn the good tidings. To the last his interest in the expedition was unabated and Mr. Rock's jeopardy was a source of great worry to him. Mr. Rock deserves high commendation for the manner in which he has successfully brought the hazardous undertaking to a successful end.

Mr. Rock spent the whole of the winter of 1926-27 at Choni under the friendly protection of the native prince, a man of character and friendly disposed towards Mr. Rock. The internecine struggle in China delayed departure and at one time it looked as if there was no possible way out of these back blocks. However, Rock determined on leaving Choni by a south-westerly route crossing into Szechuan and hence as circumstances offered. He left Choni on March 10th enroute for Sungpan Ting by way of the Lower Tebbu-land. The journey lay through wild, mountainous country where roam lawless tribesmen. On the way they were attacked by robbers who suffered fatalities, but fortunately Rock and his party escaped with minor injuries. On March 28th Rock reached Sungpan Ting from whence he writes:

"First of all greetings from Sungpan which we reached safely yesterday. It was a long and hard pull through the wilds. The greatest obstacle proved to be the Da he la (Chinese Yangpu shan), a high mountain, which is the border of the Choni (Szechuan) territory. The trail across the pass was covered by terrific snowdrifts and it took a day, 25 men working with shovels and picks, to make a trail across it. These men were Tebbus from the village of Yangpu, the last in the Choni Prince's territory. From Yangpu shan we descended a deep gorge called the Tasheku which debauches into the Hei ho. This river flows in terrific gorges down which we travelled for two days then turned up a larger river, called Peho. This river we followed to its source, which is the northern slope of the Konke la, two days north of Sungpan. While making our way up to the Konke la a blizzard raged for two days which made the crossing of the Konke la somewhat difficult. The Konke la is a large pass, not high, 11,300 feet. It consists of an alpine meadow 3 miles long and is the happy hunting ground of robbers but evidently the blizzard kept them off. At the junction of the Hei ho and the Peho we met a bunch of robbers, Tibetans, hiding behind rocks. We spied them, surrounded them and disarmed them. There were eighteen in the bunch. They were armed with flint-lock rifles, swords and huge clubs, one end of which was crowned by a metal cap with sinuations like those of a cog wheel. One knock on the head with a club like that is sufficient to kill a man. We took their arms away from them at the point of four 45 colt automaties and two rifles and two shot guns.

"Before leaving Choni I bought an extra rifle from the Choni Prince with 200 rounds of ammunition for 300 Taels. Rifles are expensive in this part of the world. We marched the robbers off to the nearest village and then made them cross the

river and go down on the other side. Not very far beyond we met another bunch. They had, however, wind of the affair and made for the hills on our approach. We stayed with the caravan the whole day and slept that night very lightly in a lonely house up that gorge. It was a hard and exciting journey, one I would not care to make again.

"As bare as the region of Sungpan is, as densely forested is the northern slope of the Konke la (the forests are immense—I wonder if Wilson has worked that region?), it is void (practically) of Rhododendrons. I saw only three bushes on the whole journey while the northern slopes of the Yangpu shan is rich in Rhododendrons, many of which do not occur in the Upper Tebbu country or on the Min-shan in general. I enclose seeds of two species from the habit of which I judge them to be yellow flowered. They reach a height of 8 to 10 feet and form a dense, round, shrubby growth at an elevation of 10,000 feet and higher. I wished I could have extended our exploration to this huge mountain—the end of Tebbu-land.

"However, with the Amne Machen and Richthofen range journeys we had too many irons in the fire. The territory we covered was rather extensive, you will admit, and it takes time in this part of the world to cover ground especially with yak and camel, which can hold pace with a snail. I had my misgivings about Sungpan, but I received a welcome reception. The officials are very friendly and they received official notice from the Chengtu governor to protect us and help us on our way. It will therefore not be necessary for us to go into Tibetan country as to Kanze and then Tatsienlu."

From Sungpan, Rock descended by the main road through the gorges of the Min River to Kuan hsien and then across the plain to Chengtu where he arrived on April 15th. At Chengtu he found that all the foreigners except the Japanese had been evacuated. He writes in haste:

"We reached Chengtu without mishap. The officials here are very friendly and are helping me by wiring to Chungking for protection, etc. As it happens the Japanese are now evacuating Szechuan and the Japanese Consul is leaving Chengtu this a.m. and I arranged to go with him. I am sending my 11 Nashi boys overland to Yunnan and I myself and my cook are going overland to Chungking. The water way would be more agreeable but fighting is going on south of Suifu and the official insists on our going overland. All the Japanese are going that way and, of course, we shall have to too. I hope we will get out now. The danger is in the lower Yangtze.

"I am writing this at 4 a.m. I have to leave everything behind except just what I shall actually need on the road. I have been in Chengtu only two days and, of course, it has been impossible to sell things at such short notice. The horses I sold to the Governor and the rifles I presented to him. Everything stays here. I cannot help it. There is now only this one Japanese boat on the Yangtze waiting to take off the Japanese and me. After that nothing more and all exits would be closed."

Leaving Chengtu with the Japanese Consul he travelled overland to Chungking and thence by steamer down the Yangtze to Shanghai, which was reached on May 7th. At Chengtu, Rock had to abandon all surplus personal belongings and travel as lightly as possible. His cook accompanied him but his collectors, whom he had taken from western Yunnan, were dispatched overland.

It is not to be surprised that after undergoing such long and severe hardships and mental strain Mr. Rock should be in poor physical condition when he reached Shanghai. However, he at once set out for Yunnan fu to repatriate his cook and assure himself of the safe arrival of his collectors who had served him loyally and well. He reached Yunnan fu on the 23rd of May. The last letter received at the Arnold

Arboretum was written from Yunnan fu, dated June 29th, part of it is as follows:

"I am just now in receipt of a letter dated June 17th from the American Express Company of Shanghai in which they say in part as follows: 'I am sure you will be interested to know that all the packages (boxes) for Harvard University have all been received by us in good condition and are being duly forwarded and our Shipping Department will give you full particulars with the next few days.'

"This is a great relief to me to know that nothing has been lost. If you consider the times and the conditions under which we have been working I must say that we certainly had good luck. We have lost nothing, not one cent of money, not a single package of seeds or a negative nor a specimen of bird or plant and what I am still more thankful for not a single life, at least not connected with my immediate party. Since I left my men, or rather 11 of them, in Chengtu from which place they found their way alone to Yunnan fu, several have been ill. They had no one to look after them and the fear and anxiety through the robber infested country alone, without protection, at least part of the time, all told on them. Four of them are in the hospital here in Yunnan fu but I hope they will soon be well and about."

E. H. W.

The Arnold Arboretum Expedition to New Guinea.—From October 1925 to June 1926 Mr. L. J. Brass has collected for the Arnold Arboretum in the British Territory of Papua which forms the southeastern part of New Guinea. He collected within this period 1165 numbers of plants representing practically as many species. During the course of his travels he stayed at forty-eight different points many of which had not been previously botanically explored. The material is now being determined at Brisbane by Mr. C. T. White, with the exception of some families and genera which have been entrusted to specialists at Kew, the British Museum and Berlin and to some private workers. Mr. White hopes to have by next year a complete account of the collection ready which will then be published in this Journal.—A. R.

The Arnold Arboretum Expedition to the Balkan peninsula.—As the Balkan peninsula is yet botanically one of the least known regions of Europe and not well represented in the herbarium of this Arboretum, an arrangement was made with Dr. J. Mattfeld of the Berlin Botanical Museum whose interesting account on the Firs of that region had attracted our attention, to make a collection of the ligneous plants of Greece and Bulgaria for this institution. Dr. Mattfeld accompanied by a young botanist, Mr. Karl Schulz, left Berlin early in May 1926 for Athens. From there he went first to the island of Cephalonia and then through northern Peloponnesus back to Athens and from Athens gradually northward to Saloniki from where he visited Mount Athos and other interesting localities in northern Greece. A detailed account of his travels and of the vegetation of the various localities he visited will be found in the present and the following number of this Journal. As it had become October before Dr. Mattfeld finished his travels in Greece, it was too late to go to Bulgaria and the continuation of the expedition was left for this year. Middle of last June he returned to the Balkan and col-

lected first in the Strandja Mountains near Constantinople and then in Bulgaria, intending to return about the beginning of September to Berlin. The collections are being determined at the Berlin Museum by Dr. Mattfeld, and those of last year are already on the way to this institution.—A. R.

Pinus nigra Arnold

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A BOTANICAL JOURNEY IN GREECE IN THE SUMMER OF 1926[1]

JOH. MATTFELD

Plates 8 and 9

ON the other side of the valley opposite the Kaliakuda which towers above Megalochorio lies its twin brother the Chelidoni with the neighboring village Microchorio at its foot. The valley of the Karpenisi which is rather broad up to this point becomes narrow in front of these connected mountains and the river flows as a torrent through a very narrow deep gorge between the two high mountains. The Kaliakuda and the Chelidoni are limestone, but at their foot flysh-like rock crops out in many places. In the evening we investigated the slopes above the several hundred meters deep gorge of the Karpenisi river. The narrow path is trodden into the easily crumbling slate as an almost impassable "goat walk." The steep rock-slides and the mostly still moving rubble slopes are for the greater part without vegetation. Here and there solitary suffruticose Labiatae and Compositae and also a few herbs have gained a foot-hold. Farther up, however, where the slopes become less steep, they are covered with Fir forest which here and near its lower limit also is mixed with Oaks; the Oaks are often infested with Mistletoe.

After our return to Megalochorio we decided to try to get information from the natives regarding the occurrence of the Horse-chestnut as we did not care to rely entirely on chance to find this rare and local tree. For this purpose it is very helpful that all male inhabitants as soon as it becomes known that strangers have arrived, flock together in the only "kaphenion" of the village, and thus we could hope to find some one who could give us the desired information. But all questions seemed to be in vain. There are two names in Greek for *Aesculus Hippocastanum:* Horse-chestnut (ἱπποκαστανιά) and wild Chestnut (ἄγρια καστανιά). The first name is often unknown, and in regard to the second one is never sure whether people who profess to know the tree have not in mind the wild form of *Castanea vesca* which occurs not rarely in the woods. Mr. Schulz tried to make the matter clear by sketching a flowering branch, but no one knew the tree, only our host said that he had seen the tree during a visit to Constantinople, but in this neighborhood it did not

[1] Continued from p. 149.

exist. We had almost given up hope when a laborer, who had been silent during the whole discussion, finally said that he knew the tree and knew a gorge near the village, about one hour's distance, where the Horse-chestnut grew. He offered to guide us the next morning, Sunday, to the spot. Though shepherds, who were grazing their flock in that region, had assured us that afternoon that Firs and nothing but Firs grew there, the man to our delight proved to be right.

We ascended the steep slope at the foot of which the village is situated and continued along the rim of the gorge of a tributary of the Karpenisi river. The rubble slopes are at first as bare as those visited the day before, but soon we reached a beautiful Fir forest which covers all the slopes above the gorge; at first it is mixed with a few Oaks, but soon becomes almost pure. The Firs we examined were fairly typical *Abies cephalonica* without hairs on the young branchlets. Soon after entering the dense forest we left the path and turning to the right soon reached the rim of the gorge which is about 15-20 m. deep with very steep sides and covered by a dense canopy of leaves: Linden, Hornbeam and Flowering Ash grow on the steep walls of the gorge, while the more open places near the rim are occupied by dense scrub of *Quercus coccifera*. Soon we spied the dense crown of the first Horse-chestnut though without fruit, but farther on we found a tree covered with its spiny fruits but unfortunately not yet ripe. The Horse-chestnut forms here not solitary stout trunks, as we see them in our parks, but each tree consists of many, rather slender, straight, upright stems. Since we intended to explore the gorge of the Karpenisi river itself, we returned to the village.

From Megalochorio we followed first the road to Mikrochorio, but after crossing the bridge we took, on the other side, the road toward the south and crossed first the rather broad and stony bed of a little brook coming from the Chelidoni Mountain. Its bed like that of the river is occupied by Plane trees accompanied chiefly along the Karpenisi River by three or four species of Salix which occasionally ascend the slopes. The road which kept from Karpenisi up to here only slightly above the bottom of the valley, begins quickly to ascend when the valley becomes narrower. The slopes before the beginning of the real gorge consist of looser or finer rubble or of primary rock, partly limestone and partly sandstone. They sustain, according to their nature, either a poor rubble vegetation or more often a very luxuriant šibljak formation of deciduous shrubs with a large percentage of evergreen elements: *Ostrya duinensis*, *Quercus coccifera*, *Q. conferta*, *Q. lanuginosa*, *Pistacia Terebinthus*, *Coronilla emeroides*, *Corylus avellana*, *Phillyrea media*, *Juniperus Oxycedrus*, *Podocytisus* (particularly on the rocks), *Tamus communis* and occasionally a few Willows; even some gnarled trees of *Abies cephalonica* are found in this already varied association. No room is left in this dense scrub for herbaceous plants; these are restricted to the loose rubble slopes. Soon we reached the narrow gorge with its very steep walls into which the road

has been blasted. The rocks are partly without vegetation, but in the crevices and on small ledges some Composites, Labiates and Caryophyllaceae represented by few species but usually many individuals have gained a footing. After a short distance the gorge expands again and we enter a very attractive but very hot and dry valley grown over with low evergreen maquis or phrygana vegetation which seems to consist of the usual elements. Extensive land-slides occurred apparently not long ago, for one sees large stretches of fresh rubble not yet covered with vegetation. Here we turned since we had a walk of eight hours back to Karpenisi which we reached late in the evening half starved and nearly parched from thirst.

On the fourth of August we succeeded in obtaining pack animals for our long planned excursion into the Oxya Mountain (Oxya is the Greek name of the Beech). The road leads first over the immense talus-cone of the Tymphrestos and then through the end of the Karpenisi valley to Laspi where we leave the road and take a path which leads over a rather steep slope to the pass through beautiful Fir forests with scattered Chestnuts. Much more common are the Chestnuts on the opposite slopes above Laspi which are exposed to the north. In this Fir forest we made the important observation that here, and also in the other Fir forests which we were to see today and tomorrow, the same variations occur as we had observed in the forest of Stenoma. Also here we had the impression that we had a population of hybrids before us.

Shortly before the pass we regain the road, but leave it again at the highest point of the pass at about 1240 m. altitude to follow toward the South the broad ridge which leads to the summit of the Oxya Mountain. First we cross a meadow where immumerable sheep are grazing and then we enter another beautiful Fir forest. In these forests the ground is densely covered for miles with *Pteridium aquilinum* which does not allow the growth of anything else. The Fir forest itself is now pure, for the Chestnut does not reach these altitudes. Between 1500 and 1600 m. the forest becomes more open and soon is left behind altogether. We gain now an unrestricted view over the immense broad ridge from which a few mountains and even the summit itself rise only slightly higher. The whole ridge is covered with a carpet of grasses and herbs and cushion plants; large stretches scattered everywhere are noticeable on account of their bright green color and turn out to consist of *Pteridium aquilinum* which thus occurs also above the tree-line in great quantity. Low shrubs appear here only rarely: *Genista acanthoclada*, *Daphne oleoides*, *Astragalus*, *Crataegus* sp. (cf. *C. Heldreichii*), *C. monogyna* and *Juniperus Oxycedrus*. The rocks consist of slate and sandstone, and these in general are poor in plants, at least at this season, and, moreover, everything is much browsed. Magnificent views present themselves over the mountains of central Greece, the Veluchi, Chelidoni, Kaliakuda, Vardussia and the high mountains behind toward the Parnassos.

On the eastern slope of the ridge, Fir forests ascend in a groove-like gorge to a higher altitude and above one recognizes, easily noticeable on account of the lighter green, small stands of deciduous trees which can be nothing else but Beech, the first *Fagus sylvatica*. As soon as we have rounded the small elevation which hitherto had obstructed the view, we see in the distance the southernmost slopes of the mountain below the summit, exposed to west and northwest, covered with immense Beech forests. After an hours' walk we reached the forest and found on examining fruiting trees that this Beech does not differ in the least from the *Fagus sylvatica* of middle Europe. Apparently no other trees are associated with the Beech, at least one can discern nothing differing in appearance, and as the interior of the forest is said to be impenetrable, we must assume that shrubby undergrowth is lacking. Regarding the habit of the trees, it is particularly noticeable that none of the trees form the mighty trunks which we are used to seeing in our northern Beech forests. Each individual consists of a more or less large number of virgate spreading slender stems forming a 7–10 m. high bushy tree. This we could ascertain only of the outer rather open part of the forest, but apparently it applies to the whole forest as the trees do not seem to reach a greater size farther toward the interior; also the stated impenetrability can be explained by the bushy habit, for it is hardly possible that a Beech forest harbors a dense undergrowth of shrubs. The question now is whether this habit is caused by some natural influence or by continuous exploitation. As forest devastation is very great in all countries of the Balkan peninsula, one would be inclined to consider this as the cause of the habit of the trees. This assumption, however, presupposes the nearness of large settlements or at least the presence of good roads which would allow the carrying away of the timber. As both are lacking here, this cause is very improbable and seems still more so, if one compares these Beech forests with bushy Beech woods in the north of the Balkan peninsula which owe their present state to constant exploitation. Such woods I saw in 1924 frequently in the middle Rhodope mountains in Bulgaria. Larger trunks are entirely lacking there; the wood is a tangle of slender stems hardly exceeding 3–4 m. in height and forming quite impenetrable thickets. The stems of the Beeches in the Oxya Mountains, on the contrary, attain mostly to the thickness of an arm or leg and even more, and thus they appear more tree-like. All this leaves little doubt that the habit of the Beeches in the Oxya Mountains, as it is now, is also their original and natural habit. Therefrom we may deduct that the Beech is unable here in its most southern locality to form the high forest so characteristic of this tree farther north; probably it is too dry and too hot. Therefore, it chooses here the comparatively cool and moist localities, that is the upper regions of the mountains, for the zone of the Beach is above that of the Conifers and constitutes at the same time the tree-line. From the summit ridge of the Oxya Mountain one can clearly observe how the

Fir zone lying deep below is nearly without transition replaced by the extensive Beech zone. This separation of the regions starts already in Macedonia, but is not so clear there, since *Pinus nigra* or *P. Heldreichii* often follows the Beech.

As this excursion in spite of its extension did not yield very much for our collection in regard to numbers, we made the following day, from the village of Gardiki where we spent the night, a wide detour to visit the forest of Muntzuraki often cited in literature. From Gardiki we went at first northward down a steep slope toward Punghakia. The slope is covered with an open, much exploited Fir forest, but soon Chestnuts begin to appear again in the forest. The valley is cultivated and between the fields we noticed several species of Oak. Then we walked downhill and uphill now through the Firs and now through fields. Everywhere are Chestnuts and Walnuts and the mountains above are covered with Firs. Punghakia consists of two villages separated by an hour's walk; above the second village we ascend the steep heights which bear the forest called Muntzuraki. This is, indeed, a very beautiful forest which partly consists of a mixture of Fir and Chestnut and partly of Firs alone. A slope covered with such mixed forest was destroyed by fire about ten years ago and in its present condition shows well the advantage of deciduous over coniferous trees. Though the capability of regeneration is much more developed in *Abies cephalonica* than in *A. alba*, it is not such as to allow burned down stumps to produce new shoots. In case of forest fire this Fir regenerates only by seeds, but young trees were very rare on this burned over slope; probably it had been up to now too dry and too sunny. The Chestnut, however, had formed abundant coppice and the whole slope was covered with a tall shrubby growth. These Chestnut bushes had the same appearance as the Beeches on the Oxya Mountain, but with the difference that each many-stemmed individual still showed in the middle the old charred stump surrounded by the new shoots which already bore flowers. The whole forest, therefore, has become now a rather open brushwood of Chestnut.

Through a mixed forest of Fir and Beech above the burnt area we ascend to a ridge which is an eastern spur of the Oxya Mountain. This mixed forest extends up to the top of the ridge in a grandeur hardly seen elsewhere, so that one did not know whether one should admire more the gigantic proportions of the trees or the density and vastness of the forest. As soon as one has crossed the summit of the ridge (1450–1500 m.), the Chestnuts disappear. Hence they apparently reach only on southern slopes such high altitudes, while on northern slopes such as we now descend, they reappear much farther down. The pure Fir forest which follows is no less imposing for it also consists partly of beautiful old trees. It may be stated that here also the Firs are represented by different forms, with glabrous or pubescent branches, acute or obtuse leaves, either radially spreading or more or less pectinate. The only admixture we saw in this

forest was a beautiful specimen of *Ilex Aquifolium*, a species which we had not encountered before. Heldreich, Halacsy and Chloros record in the forest of Muntzuraki several other trees which we, however, did not see. The forest is very extensive and it is probable that these trees occur in the lower regions of the eastern part of the forest.

Numerous smaller and larger brooks which flow into the right arm of the Sperchcios cut into the ridge of Muntzuraki on its northern side. These gorges are accompanied by a broad growth of beautiful old Plane trees which often ascend the slopes of the gorges and invade the Fir forest. Under these conditions the Plane reaches an altitude of nearly 1400 m.

We descended in westerly direction to the Oxya ridge and following the road below the ridge we reached the pass from which we had started the day before. Here at the altitude of 1250 1300 m. the Fir forest ends and the slope of the ridge is covered with a rather meagre growth of *Juniperus Oxycedrus*. From the pass we returned by the road already described to Karpenision. The excursion was phytogeographically very interesting, but floristically it did not prove so profitable as we had expected. As we could not expect to find any more important woody plants near Karpenision, we left this place on the ninth of August for Saloniki by the way of Lamia and Larissa.

From Lamia the railroad cuts through the western spurs of the Othrys Mountains which are covered with a maquis formation similar to that seen in the Thermopyles, but the great amount of the wild form of *Olea europaea* was remarkable. Then we descend into the wide plain of Trikkala which constitutes an immense pasture and affords beautiful views of the high mountains of the Pindus range. After crossing a broad range of hills covered with meagre vegetation we reach the plain of Larissa which is entirely under cultivation.

From a visit on the following day to the Tempe valley, which has been so much praised for its scenic beauty and botanical interest, we expected much, but as it often happens such glowing descriptions evoke too great expectations. We were somewhat disappointed, particularly as we had seen in the gorges near Triklia, in the Klissura near Aetoliko and in the chasm of the Karpenision river near Megalochorio, gorges which surpass the Tempe valley in scenic beauty and partly also in botanical interest. Nevertheless the Tempe valley is a beautiful, well wooded gorge, now narrower and bordered by steep cliffs, now wider with gently sloping sides. The tree growth along the river itself is very luxuriant and consists of *Platanus orientalis*, *Populus alba* and *P. nigra* and several species of *Salix*; the slopes are often covered with a dense growth of *Quercus Ilex*, *Q. lanuginosa*, *Ficus Carica*, *Punica Granatum*, *Paliurus aculeatus*, *Vitis* sp. (probably *V. silvestris*). These notes are based on observations from the train. The railroad after leaving the Tempe valley turns to the north and follows the small strip of land between the Olympus mountain

and the sea. The landscape for wide stretches consists of the talus-cones of the eastern foot hills of the mighty Olympus massif and is characterized by a vegetation of šibljak-like formations and maquis of *Quercus coccifera*. *Paliurus aculeatus* is very common and dominates wide stretches. Next we crossed the extensive Vardar swamps devoid of tree growth and soon reached Saloniki, which was to be our head-quarters for several weeks and the base from which we intended to visit the Athos peninsula and Thracia. As the time at our disposal was too short to visit both the Olympos and the Athos mountains we selected the latter, because botanically it is less well known than the former. In the evening of August 19 we left Saloniki by boat and arrived the next morning in Daphni, the port of the Holy Mountain "Hagion Oros." This forms within the Greek State a republic of monks with its own government and administration. To be allowed to enter this republic we had received from the Department of Education in Athens a letter of recommendation which was exchanged by the Holy Synod residing in Karyes, the capital of the republic, for a letter of introduction to the monasteries which constitute the republic and of which there are twenty. Without such a letter of introduction by the Holy Synod no one is admitted to any of the monasteries. On the way from Daphni to Karyes we were struck by the luxuriance of the vegetation as well in the maquis formation as in the mixed woods above. Not only are the trees and shrubs represented by many species, but also the species are present in a large number of individuals and the latter as a rule are well developed.

The maquis formation is a mixture of great variety without a dominant component. The chief constituents are: *Laurus nobilis*, *Quercus coccifera*, *Q. Ilex*, *Phillyrea media*, *Olea europaea* (the wild form), *Cercis Siliquastrum*, *Pistacia Terebinthus*, *Fraxinus Ornus*, *Spartium junceum*, *Arbutus Unedo*, *Osyris alba*, *Rubus* sp., *Erica arborea*, *Smilax aspera*, *Clematis*, sp., *Ephedra campylopoda* (between Daphni, Xeropotamu and Russikon very common, but not observed on the east slope); near the monastery Russikon we noticed trees of *Arbutus Andrachne* which is here very rare; *Quercus lanuginosa* occurs occasionally, but becomes more common higher up. In the gorges *Platanus orientalis* forms a beautiful growth. There are few herbs, but we notice the first flowers of *Scilla autumnalis* which remind us that autumn is near. Toward Russikon the maquis has been cleared and the monks have planted Olive-trees; also Figs are much planted in this region.

At 300–350 m. altitude a small flat ridge projects from the main ridge toward the west. It is in places covered with a nearly pure bushy growth of *Quercus conferta* mixed with a few *Q. lanuginosa*. But here much wood has been cut and it seems as if the Oak vegetation owes at least its pureness to the influence of man. Another small neighboring ridge bears a rather large stand of *Pinus nigra* of which scattered individuals can be observed also at the border of the Oak region; and strange enough

one observes among the *Pinus nigra* solitary trees of *P. halepensis*, a mixture which I have not seen elsewhere and, moreover, the occurence of *P. nigra* at such a low altitude is surprising, for on the Athos mountain itself it is not found much below 1000 m. altitude. *Pinus halepensis*, however, belongs in this region, but it is rather rare on the Athos peninsula and we never saw it forming forests. On the west coast these trees were the only individuals seen, while on the east coast we found only scattered trees southwest of Iwiron not far from the spring of Sanct Athanasios in the maquis formation.

On the upper margin of the Oak bush mentioned above, the first trees of *Castanea vesca* begin to appear which gradually increase and form large forests. These forests are very rarely pure, but are nearly always mixed with at least a few Firs. On the lower limit one notices also some *Pinus nigra* between the Chestnuts, but occasionally the Firs predominate, and on the slopes south of the road from Daphni to Karyes we find nearly pure Fir forests. On the eastern side the mixed forest extends to immediately above Karyes (about 400 m. altitude). On this side, above Karyes, we had, on several occasions, the opportunity to examine this forest more closely. One notices at once, and this is somewhat disappointing, that it is not a virgin forest. As after the war the subventions which the monasteries received from the government ceased, the monks were forced, more than before, to obtain revenues from the forest by the sale of timber. This is done partly by the manufacture of charcoal and partly, as we were informed, by cutting the wood every twentieth year. Afforestation, of course, is not practiced. The Chestnuts are cut down completely, while of the Firs some trees or all of them are left standing, whether as seed-bearers or because the wood is less in demand, I have not been able to ascertain. The Chestnuts soon form new sprouts which grow very rapidly and flower and fruit after a few years. In the middle of a circle of slender stems the stump of the old felled tree remains visible for a long time. Thus the whole forest has in its general appearance much resemblance to the burnt slope in the forest of Muntzuraki described above. The Firs regenerate by abundant seedlings in all stages from very young plants to mature trees.

Though Fir and Chestnut are here the dominant elements, they are not the sole constituents of the forest as in the southern Pindus. It is not surprising that *Platanus orientalis* ascends here in the gorges to the elevation of these forests. Other accessory elements are *Acer Pseudoplatanus* and *Quercus Ilex*. According to Grisebach, *Fagus sylvatica*, which he observed gregarious on the western slopes of these mountains farther south, is supposed to occur also in the forest above Karyes. But we looked there in vain for it. It is, however, its profuse and luxuriant undergrowth that distinguishes this forest more than anything else from all those seen before. *Ilex Aquifolium* is often present in such abundance that the forest becomes impenetrable. In its spiny character it is assisted

by *Ruscus aculeatus* and *R. Hypoglossum* which often cover the forest floor completely and leave no room for anything else. Also *Quercus Ilex* appears, often only as shrub. More locally restricted are *Pyrus* (*Sorbus*) *torminalis*, *P.* (*Sorbus*) *domestica*, *Sambucus nigra*, *Corylus* and *Daphne*. On somewhat more open places the forest is invaded by elements of the maquis and the Oak region, such as *Fraxinus Ornus*, *Quercus lanuginosa*, *Q. conferta*, *Cytisus* (two species) and along the roadside *Laurus nobilis*. In moister and less densely wooded gorge-like hollows a species of *Rubus* often forms a dense tangle and passes into lianas, for it climbs into the trees up to nearly 10 m. high. Two other vines which we observed were *Hedera helix* and *Clematis*. Of the herbs which were mostly out of bloom at this time, I may mention *Cyclamen hederaefolium* whose flowers were appearing everywhere. The profuse development of Ferns indicates the great amount of moisture prevailing in these forests.

Karyes itself is situated near the lower limit of this forest toward the maquis formation, but this is somewhat obscured by the fact that here felling and clearing has been extensively practiced. Along the road-sides the maquis elements mentioned above for the more open parts of the forest penetrate rather far upward. Below Karyes, however, elements of the forest flora are lacking and a luxuriant maquis formation prevails. This is on the whole very similar to the maquis on the west side, but shows some differences, as the absence of *Ephedra campylopoda*, and the occurrence in great masses of *Erica arborea* and species of *Cistus*, but I do not wish to emphasize these facts, since our sojourn there was too short to find out whether these were not accidental impressions caused by the comparatively small number of localities visited.

A common feature of the maquis of the east and the west side is certainly this, that here, as is often the case on the continent, not a single species prevails, but that the whole formation represents a rather uniform and varied mixture. The characteristic elements are: *Quercus coccifera* in many different forms, of which some seem to be restricted to certain regions, *Arbutus Unedo*, *Erica arborea*, *Phillyrea media*, *Quercus Ilex*, *Sparrium junceum*, *Osyris alba*, *Smilax aspera*, *Calycotome*, *Cistus* (two species). In addition deciduous elements also play at the upper limit an important part such as *Quercus conferta*, *Fraxinus Ornus* and *Lonicera*, while at this time only few herbs are still to be seen. Farther down toward the sea the deciduous elements gradually disappear, and *Erica verticillata* and a third *Cytisus* enter.

In regard to the Chestnut and the Fir some observations may be recorded. The *Castanea vesca* of the woods is the wild form, for we were told, that the fruits of these trees are not edible and that the monks use only the wood. But this is contradicted by the statement of Fallmerayer who visited the Athos mountain in autumn, that the monks gather and eat the fruits of this tree. At the time of our visit the fruits were still too young, so we could not decide this question.

About the Firs of the Athos Mountain heretofore little was known. Some believed that it is *Abies cephalonica*, others considered it *A. alba*, and still others assumed that according to Grisebach's statements the two species occurred on the Athos peninsula. The Firs in the forests above Karyes show a similar variety of forms as observed near Karpenision, but with some further deviation. Pungent leaves can hardly be found, even if some leaves may be called pointed; very often they are rounded at the apex and sometimes a distinct emargination can be observed. Generally one has the impression that the influence of *Abies alba* is here much greater than in the southern Pindus; also the buds are often only slightly resinous. The trees are one-stemmed; gnarled and branched trunks are not obvious; the position of the leaves varies between that of *A. alba* and *A. cephalonica*. These variations will be studied in detail on the collected herbarium material.

From August 25 to 28 we made a four days excursion to the summit of the Athos. On the first day we rode from Karyes by Iwiron and the spring Hagios Athanasios to the monastery Lawra, the second day by Kellia Kerasia to Athonos Panhagia and ascended the summit. We returned by the same way to Karyes. Grisebach has described this tour in great detail.

Until Lawra is reached one remains always in the maquis region. The road leads all the time down hill and up hill, as numerous valleys and their separating ridges have to be crossed, though the altitudinal differences amount to hardly more than 200 m., but in spite of that the aspect of the vegetation varies greatly. A very high and at the same time very dense and therefore impenetrable maquis formation prevails of a luxuriance such as observed by me nowhere else in Greece. Although the composing elements are always the same, they are rarely observed in such completeness as here. *Quercus Ilex* is hardly ever lacking, but *Q. coccifera* does not play its usual prominent part; it covers some slopes, but in many instances it is only sparingly represented and frequently it is entirely lacking. *Phillyrea media* is sometimes a small tree. One of the most common elements is *Laurus nobilis*, but it is not found on the drier slopes. *Arbutus Unedo*, on the contrary, is more evenly distributed, while *A. Andrachne* is lacking entirely. *Erica arborea* is no less common, but often grows together with *E. verticillata* which also forms stands by itself and is now in bloom. *Juniperus Oxycedrus* and *Myrtus communis* are restricted to the hottest and driest slopes. Other elements of more or less importance are: *Quercus lanuginosa*, *Q. conferta*, *Q. cf. sessiliflora*, *Cercis Siliquastrum*, *Ostrya*, *Pistacia Terebinthus*, *Olea europaea*, *Ficus Carica*, *Fraxinus Ornus*, *Coronilla emeroides*, *Rubus aculeatus*, *Paliurus aculeatus* (very sporadic), *Osyris alba*, *Lonicera*, *Spartium junceum*, 3 species of *Cistus*, *Rosa* sp., *Cytisus* sp. and *Hypericum* sp. The whole is entwined by a many-stemmed tangle of vines which makes it quite impossible to penetrate this formation. The worst of these is *Smilax aspera*, now in places studded with its red

berries. A climbing Rose (*Rosa* cf. *sempervirens*) is not rare but much less armed than the Smilax. *Vitis sylvestris* often covers its host entirely with its luxuriant foliage; its small blue berries are somewhat acid, but refreshing to the parched throat. Everywhere one sees the white wigs with which two species of *Clematis* adorn the bushes of the maquis, and more modestly *Tamus communis* creeps between, while *Hedera helix* is found more often in rocky places, but also climbs high trees or trails plentifully between the shrubs. *Humulus lupulus* like Vitis prefers moister localities.

The interior of this maquis formation is so dense that the lack of light makes the development of herbaceous vegetation impossible. Only along the roadside some herbs are blooming, while at a more favorable season the more open places are adorned with a fairly abundant herbaceous growth.

The very diversified territory with many now broad now narrow and channel- or gorge-like valleys and the intervening ridges which in the middle of their course are often gently sloping, but toward the sea drop abruptly by precipitous cliffs or slant more gently, results in a greatly varying development of the maquis formation and also affords opportunity for other formations to gain a foothold. A few of these small valleys expand at their mouth into a 20 to 30 m. wide bottom kept moist by a brook which carries water all summer. In consequence a dense stand of high *Alnus glutinosa* develops interspersed with *Platanus orientalis* beneath which in the humus *Osmunda regalis* luxuriates. Mostly, however, the valleys are narrow and the slopes slant down to the brooks, so that no swamp is formed. Instead of the Alder woods the forest of the next higher region extends under these conditions farther down, almost to the sea. The presence of the forest in the maquis region can be explained by local climatic conditions caused by the moist gorges which are protected by the adjoining ridge running from west to east from the full action of the southern sun; for this reason it is chiefly the slopes of northern exposure which bear this forest. As in the upper region *Castanea sativa* is also here the dominant forest tree, but there is a great difference in so far that in this forest which breaks like a wedge through the maquis region, the Fir, the second important component of the upper forest, is lacking entirely. In its stead *Quercus Ilex* plays a much greater part. Besides one sees, though more rarely, *Acer Pseudoplatanus*, *Tilia* sp., *Pyrus* (*Sorbus*) *torminalis* and *P.* (*Sorbus*) *domestica*, and of elements of the maquis *Laurus nobilis* as undergrowth.

The cliffs near the coast by which the ridges drop to the sea bear besides several beautiful perennials (*Silene*, *Cineraria*, *Plantago*, *Armeria* and Umbelliferae) often in great quantities a shrubby *Chamaepeuce* which we had seen already at the west side on cliffs near the monastery Xeropotamu.

Exposure has also apparently much influence on the composition of

the maquis formation. One can observe that the slopes of southern exposure which are higher or jut out farther toward the sea and therefore are exposed to the full sun, are covered with a comparatively poor and low *Quercus coccifera* maquis including *Phillyrea media* and *Myrtus communis*. In such a locality we also saw a few trees of *Pinus halepensis*.

Late in the afternoon we arrived at the Lawra monastery where we stayed over night. The neighborhood of the monastery is entirely cleared and planted with fruits, grapes and vegetables. In the court of the monastery are still standing the old Cypress trees mentioned by Grisebach and which, if his estimate is correct, must now be about 1100 years old.

The following day we ascended from Lawra (65 m. alt.) by the way of Kellia Kerasia (700 m. alt.) and the Athonos Panagia (1354 m. alt.) to the summit (1935 m. alt.) of the Athos Mountains which gives the name to the peninsula. This mighty massif rising abruptly from the sea consists of marble, while the largest part of the "Holy forest" has mica-schist as a substratum with scattered islands of marble. The road leads in southern direction gradually ascending first through a rather meagre *Quercus coccifera* maquis apparently burned over a few years ago. It also contained a few solitary *Fraxinus Ornus* and *Phillyrea media; Euphorbia acanthothamnus* is common, and Grisebach also mentioned *E. dendroides*. This maquis is occasionally cut by the monks, as we noticed near Karyes. They, however, do not cut down everything without discrimination, as it is often done by others and may perhaps be the rule, but the monks take out only the scrub (*Erica arborea*, *Quercus coccifera*, *Cistus*, *Calycotome* etc.) and leave the many small stems of *Quercus Ilex*, *Fraxinus Ornus* and *Arbutus Unedo* standing. What the purpose of this procedure is, I could not find out; perhaps they expect to raise in this way a high forest.

Gradually the road ascends to higher altitudes, and we reach a skiti (a small settlement of monks) which is situated in a small but high-stemmed grove of *Quercus Ilex* and *Q. lanuginosa*. The slopes around this skiti are formed by large moss-clad boulders with a luxuriant maquis between them of similar composition as that between Lawra and Iwiron. Somewhat higher appears again a meagre vegetation of *Quercus coccifera*. At about 600 m. altitude, however, the vegetation changes abruptly, when we cross a projecting ridge by a small pass adorned with a chapel, and the direction of the road changes from south-south-east to west or west-north-west. Directly behind the pass we were greeted by some beautiful tall-stemmed *Acer monspessulanum*, but the high forest cannot yet attain to a full development. The very steep hot slopes are covered for a short distance with a maquis vegetation which, though rather high and often forest-like, is very open on account of numerous scattered fragments of rock. *Quercus coccifera* and *Phillyrea media* form 4–5 m. high bushy trees and show a great variability in the shape of their leaves, so that the species are often difficult to recognize. Between them appear

deciduous shrubs in greater quantity than in the lower maquis, though they are mostly the same species, as *Carpinus*, *Fraxinus Ornus*, *Acer monspessulanum*, *Quercus lanuginosa*. Besides these *Juniperus Oxycedrus* and also *Arbutus Unedo* are frequent, but of the rarer *A. Andrachne* we noticed only a few bushes. The whole region is a field of struggle between the high-forest which begins above and the gradually disappearing maquis formation. In this locality, however, one cannot get a clear insight into this transitional region, since charcoal burners are here working and have already over a wide area cut all serviceable wood. For centuries the manufacture of charcoal, which in Greece is the customary fuel, has been going on on the Athos peninsula. Without doubt the charcoal burner often has to change to other localities and thus continually destroys new maquis and woods.

It is obviously very difficult to gain, after such a short sojourn as allowed us, a clear idea how deep a change this kind of exploitation causes in the vegetation and how the exploited wood formations react after being again left to themselves. Sometimes I had the impression that the meagre *Quercus coccifera* maquis was not always caused by natural conditions, but by the manufacture of charcoal, since on such places evidence of man's destructive activity could often be found. In consequence of these circumstances the high forest begins rather abruptly at an altitude of 650 m. Two not very distant springs give to this place the name "Cold Waters" (Kryo nero or Krya nera). Soon one reaches the vigorous springs near the Kellia Kerasia (about 700 m. alt.), while higher up no more springs are found, and one has to depend on a few cisterns which, however, this year contained only a little water unfit to drink.

The forest region occupies the zone between 600–650 and 1500–1550 m. altitude, but individual trees ascend to 1600–1650 and according to Grisebach to 1700 m. The differences in the altitudes, however, and the varied topographical configuration produce the most diverse pictures of forest vegetation. Right at the beginning between the springs and the Kellia Kerasia is a rich and luxuriant mixed forest whose predominant elements are *Castanea vesca* and *Abies*, but with a frequent admixture of *Populus tremula* which is entirely lacking in the forest above. Also *Acer pseudo-platanus* is not rare. These are all the more important forest trees. In the beginning there are also handsome tree-like *Quercus Ilex* interspersed, while *Q. lanuginosa* prefers the more open places. Of the woody plants which we had already noticed in the lower regions a few remain faithful to the whole or to the larger part of the forest region; these are *Fraxinus Ornus*, *Carpinus*, *Acer monspessulanum*, *Quercus lanuginosa* and *Juniperus Oxycedrus* which occupy particularly the open sunny places. More characteristic of the forest proper are *Pyrus* (*Sorbus*) *torminalis*, *P.* (*Sorbus*) *Aria* and *P.* (*Sorbus*) *domestica*, of which the first two ascend to the upper Fir forest (about 1350 alt.), while all three occur also in the wedges of the forest referred to above which extend into the

lower maquis region. Of evergreen woody plants only two are native to this forest, namely *Ilex Aquifolium*, which usually occurs as undergrowth, but also grows up not infrequently into good-sized trees, and *Hedera helix* which clutches with thick old stems the trunks of trees. Other undergrowth is very sparse in the dense forest, here and there an *Evonymus* or a *Sambucus nigra*. In the clearings, however, *Rubus*, *Rosa*, *Crataegus*, *Sambucus nigra* and *S. Ebulus*, *Juniperus Oxycedrus* and *Pteridium aquilinum* form, entwined with *Clematis*, real thickets.

The development of the forest, however, in this luxuriance is apparently possible only in the gorges and valleys, as is the case round the Kellia Kerasia. From the first spring of the Cold Waters one obtains a good view of these conditions, as one can overlook the whole wooded gorge and the slopes up to the summit. One sees the whole forest which in its upper contours is very irregular. Above it rise mighty ledges which for edaphic reasons cannot support a luxuriant forest, but bear in the crevices a loose scrub of *Fraxinus Ornus* and *Carpinus duinensis*. Below the summit one recognizes finally an open, pure Fir forest. But also the more rounded ridges do not support that forest, as we shall see when continuing the ascent. The road leads through forest only up to 200 m. above the Kellia Kerasia. The Fir is here very common and often forms pure groups and stands. It is, however, mostly accompanied by the deciduous trees mentioned above, of which *Castanea vesca* becomes sparser. At about 900 950 m. altitude the forest ends with a few groups of Firs, and evergreen scrub of *Quercus coccifera* takes its place mixed with the deciduous elements of the maquis formation. The slope is steep, hot and dry; this causes the sudden and unexpected change. Also this growth is small, for soon we have to cross an immense field of large blocks of marble apparently of recent origin; between the block only a few herbs and perennials have established themselves, but no woody plants are found yet. This field of detritus covers the crest of a ridge, on the other side of which is a small bare valley and again a ridge with gentler rounded slopes covered with soil, but the beautiful forest does not reappear here and instead we find a small grove of *Pinus nigra* (at about 1000 1100 m. alt.). Except this grove we saw on our way only solitary trees of this Pine. Grisebach must have taken the more easterly road to the Athonos Panagia, for he states that after crossing the rich mixed forest he traveled some time through a pure forest of *Pinus nigra*. This forest we noticed later from above.

Also the ridge on whose crest the road continues for a short distance bears no continuous forest. Meadows spread out and one sees some scattered small groves; *Castanea vesca* appears very sparingly, but most of the ground is occupied by a mixed shrubby growth of the usual often named species. At about 1200 m. altitude we reach the end of a valley of a small brook and we climb up on its right slope. Here we find unexpectedly on a hot and dry slope covered with large boulders of marble

once more an extensive growth of *Quercus coccifera*. Hardly 50 m. higher up the valley becomes narrower, but its bottom is nearly flat and bears a mixed Fir forest somewhat reduced but still well developed.

From the preceeding brief statements a separation of the vegetation of the Athos mountain into distinct regions which are certainly chiefly due to climatic influences can be recognized. But one also notices that the very uneven territory creates in close proximity different local climates due to edaphic conditions and this disturbs considerably the normal zoning of the vegetation. We have seen already that in favorable gorges the forest extends down to the sea, while on the other end the maquis formation, at least as a growth of *Quercus coccifera*, appears at the upper limit of the forest region even without being connected with the regular maquis zone. Inversely one may state, that the presence or absence of a formation of a certain zone is to a certain extent due more to topographical conditions than to altitude. Above the Fir forest mentioned above in which charcoal burners have established themselves, the valley ends with steep slopes but extends still to Athonos Panagia. On the ridge to the right the forest of *Pinus nigra* can be seen and between many stands of *Populus tremula* at about 1300 m. altitude. But the greatest part of the basin is covered with a šibljak-like usually very open bush which not infrequently changes into a thin deciduous forest in which *Quercus* cf. *lanuginosa* predominates, often accompanied by *Carpinus duinensis*, *Acer* sp. and *Fraxinus Ornus*, while *Pyrus* (*Sorbus*) *Aria* and *P.* (*Sorbus*) *torminalis* are rarer. Scattered *Abies* and *Pinus nigra* complete the picture. The usually very clear ground beneath is frequently covered with a dense tangle of *Rosa* sp. and *Rubus* sp. Also grassy meadows change with pastures rich in herbs of which, however, only few are still in bloom. Autumn colors already begin to show.

Little below the Athonos Panagia (1354 m. altitude) the Firs condense into a small thin stand which contains also the last *Pinus nigra* and *Pyrus* (*Sorbus*) *Aria* with *Juniperus foetidissima* as a new element represented by a few meagre individuals. Abundant thorny scrub is found near this chapel; besides a Rose it is particularly *Berberis cretica* which forms large thickets, but also thorny *Astragalus* characteristic of all Greek high mountains is not lacking. On the slopes above the chapel a pure and thin but close Fir forest extends upward to about 1550 m. altitude. Other admixtures are lacking in this Fir forest and of shrubs I noticed only a browsed specimen of *Lonicera*. Otherwise the undergrowth is strictly alpine.

In the afternoon we reached the Athonos Panagia and after resting we made the fairly easy ascent to the summit, where we enjoyed at sunset one of the most beautiful views imaginable; far in the west the Olympus shone in the last rays of the sinking sun and deep below the Chalidice with its three arms stretching out into the sea was gradually swallowed up by the darkness which approached with subtropical suddenness. We had to return in the dark to the chapel, guided by a fire-signal from our

guide whom we had left there with the horses. That night we spent in the comfortably heated guest-room of the chapel. The top of Mount Athos is famous for its rich herbaceous flora but it was too late in the season and most of the plants were out of bloom. Woody plants are less common, the most frequent is an *Astragalus*, and a few shrubs of a *Rhamnus* and of *Prunus prostrata* inhabits crevices of the rocks. During the following two days, collecting on the way, we returned by the same road to Karyes. From there we went back to Daphni where we had to wait three days for a steamer to Saloniki.

A few words may be said about the Fir forms of the Athos mountain. A form with pubescent branches could not be found in spite of our diligent search for it, but nevertheless we observed a great variety of forms in the lower mixed forest near the Kellia Kerasia, for the length of the leaves, the shape of their apex and their position on the branch varied in the same way as in the forest above Karyes. The Firs, however, of the upper pure stands near the Athonos Panagia were much more homogeneous, and to our surprise they could not be distinguished from the true *Abies cephalonica*. The question how this regional distribution could be explained has to remain open for the present, but these findings strengthen the belief that here also the mixture of two species is the cause of the variation.

From the 4th to the 16th of September we were occupied with pressing and drying the material collected; it was a slow process on account of the high humidity of the air and the character of the material which consisted largely of Firs and evergreen plants.

On September 17 we went by train to Drama. North of Saloniki the railroad runs through gently hilly country to the Doiran lake. Everything is bare and burnt and only few plants still flower on the slopes and harvested fields. The country along the lake is more beautiful and the lake itself was wildly agitated and showed beautiful whitecaps. In contrast to the mountainous Serbian shore the Greek shore of the lake is flat and swampy. Eastward stretches to the Struma a beautiful lowland forest ("Auwald") hardly interrupted by a low water-shed. From the train we could distinguish *Alnus glutinosa*, *Salix* in about four species, *Populus nigra*, *P. alba*, *Fraxinus* cf. *excelsior*, *F.* cf. *oxyphylla*, *Tamarix*, *Platanus orientalis*, only scattered, *Pyrus* cf. *communis*, *Ulmus* cf. *campestris*, *Juglans regia*, *Quercus* sp., *Rubus*, *Corylus*, *Cornus;* between these only thistles were blooming now and often large hillocks of *Arundo donax* could be observed. Particularly striking is the great development of vines: *Clematis* cf. *Vitalba*, *Vitis sylvestris*, *Humulus lupulus*, *Convolvulus sepium*, and *Periploca graeca* (?) climbs on the trunks up into the crowns; also *Smilax* seems to occur, but could not be distinguished with certainty. This vegetation obtains along the entire southern foot of the Belasitza (Belesh Planina) to the Struma river. There is a contrast between the luxuriant lowland wood and the mountain rising north of the railroad

abruptly from the plain to 1800 m. altitude. The lower region (southern slopes) of the Belasitza are covered with maquis and phrygana formations, while above rather extensive forests prevail, apparently Beeches, but also Firs seem to be present. As soon as the railroad has crossed the Struma river which here is fairly broad and swift, the landscape changes entirely. The lowland forests disappear entirely. Beyond Sidero-kastron (Demir-hissar) the whole somewhat hilly plain is cultivated; tobacco and cotton cover wide stretches. Lashed by the wind the whole country is enveloped in a cloud of dust. To the left appears for a short moment the short but imposing ridge of the Ali-botush Mountain and to the right one sees occasionally the Tahino Lake which is separated by a chain of low hills from the railroad. Then rises to the right the steep and apparently quite bare ridge of the Pilav tepe and soon we see our next goal tower steep and high from the plain. Its southern slopes seem to be also quite bare and only below covered with a sparse maquis vegetation. The next day we visit these slopes from Drama and find the barrenness of these slopes seen close by still more depressing and cheerless, for from a distance one is impressed by the imposing mountain, while at close view one has before the eyes only the thin, hardly 1–3 ft. high, scrub of *Quercus coccifera* and *Paliurus aculeatus* with scarcely any flowering herbs between. Only a small decumbent *Euphorbia* seemed interesting enough to be collected.

The advanced season forced us to restrict our excursions in Thracia to the two most important ones. From Drama we intended to visit the Boz-dagh chiefly to investigate which Fir (whether *Abies Borisii regis* or *A. cephalonica*) grew there, for Professor Stojanoff of Sofia had informed me that he had seen during the war Fir forests in the distance on the Boz-dagh. Another excursion we intended to make from Komotini (Gumuldzhina) into the Kodsha Jaila of the southeastern Rhodope Mountains, since Dingler had collected there about fifty years ago a Beech which in the shape of the appendages of the cupula shows a transition between *Fagus orientalis* and *F. sylvatica*. Both territories are near the Bulgarian-Greek frontier and one cannot travel there without military protection. On the strength of the letter of recommendation from the Greek Department of State and through the good offices of Mr. Wegener, chancellor of the German Consulate, the Director of the Political Department of the General Government in Saloniki, Mr. Sekkos, had advised the Generals of Drama and of Komotini of our coming who in turn recommended us to the care of the commandments of the local military posts. Otherwise we could not have undertaken these excursions.

On September 19 we went via Guredshik to Zernovo to report to the commandant there and then returned to Guredshik which is situated in the northwestern part of the Boz-dagh Mountain and whence we intended to make our excursions into the mountain.

The ride from Drama to Zernovo is very interesting for the reason that

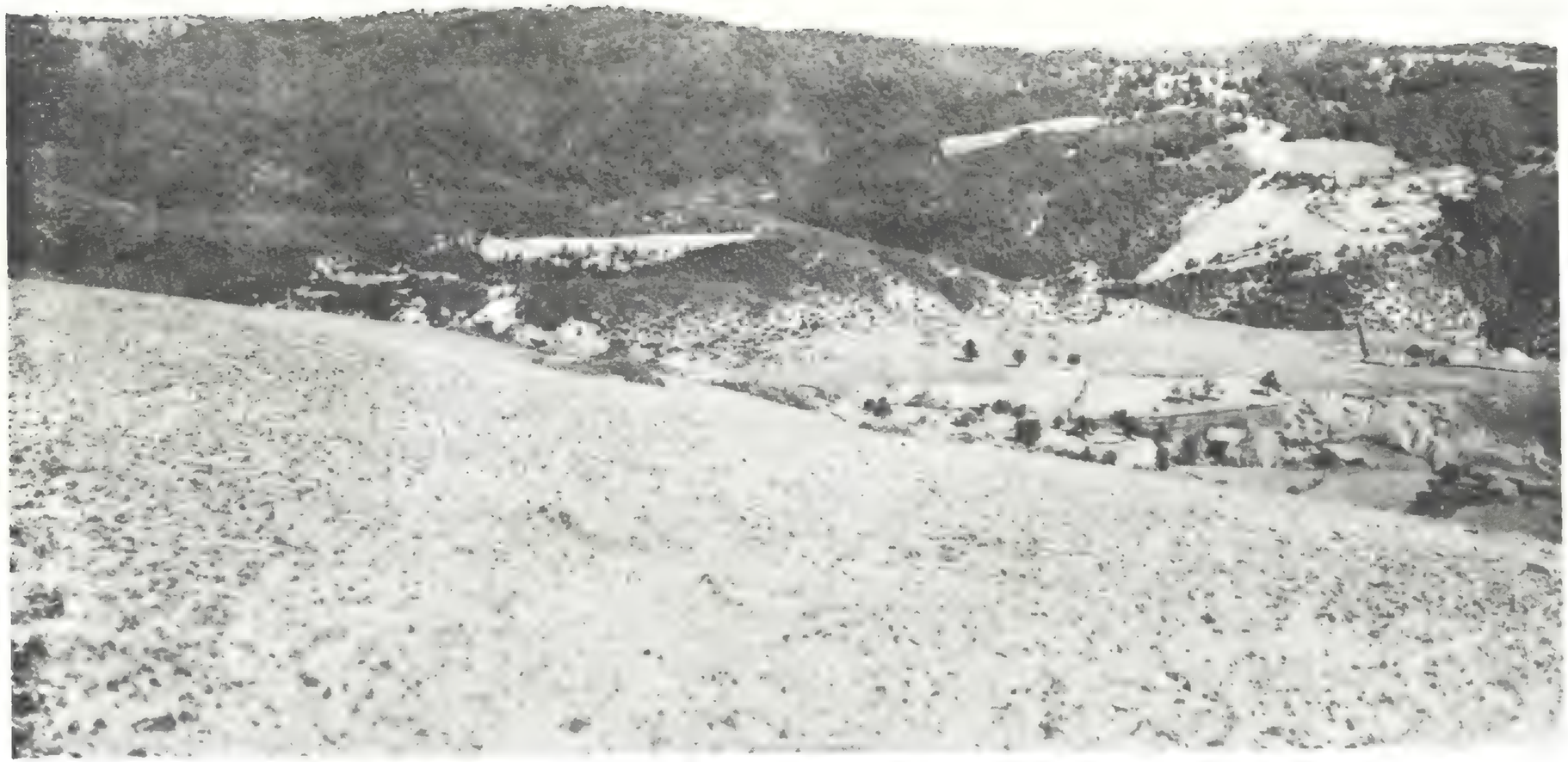
it takes one within a very short time from the typical Mediterranean flora into the southernmost region of the Middle-European flora. At first the road runs in northwestern direction along the southern foot of the Boz-dagh through extensive tobacco fields, until the road at the western end of the massif turns into the gorge of the Derbend Deresi where it climbs up by serpentines. At the entrance into this gorge at first a meagre maquis vegetation of *Quercus coccifera* and *Paliurus aculeatus* prevails, only in the bed of the river they grow more luxuriantly together with *Rubus*, *Rosa*, *Clematis*, *Vitis sylvestris*. With increasing altitude other elements appear in the maquis of which *Acer monspessulanum* and *Carpinus duinensis* are the most important. At about 450–550 m. altitude *Quercus coccifera* becomes gradually scarcer until this species, which is more characteristic of the Mediterranean flora than any other, suddenly disappears entirely. In its stead *Fagus sylvatica* appears, at first in scattered bushes later in close stands with plentiful admixture of *Corylus avellana*, which together with some other elements form a very dense bushy wood. This wood, however, is entirely artificial, for it consists of stool-growth of trees cut down a long time ago by man: also now all the fairly thick stems are cut continuously and one sees all the time teams with long thin poles of beechwood going down to Drama.

The suddenness of this transition from the Mediterranean flora to that of Middle Europe is, of course, essentially caused by the mountainous character of the country; nevertheless it is not simply a regional division within the Mediterranean flora, as we have observed it also on the Oxya Mountain in a way in some respects similar, though in detail very different, but with this change the extension of Mediterranean formations toward the north ceases entirely. Some Mediterranean species may appear locally in favorable places, but they never combine to form characteristic formations.

The Beech appears in this gorge at a surprisingly low altitude and the transition occurs without interposition of a pronounced Oak region. The reasons for it are local climatic conditions caused by the narrowness of the gorge and the fact that its rather steep western walls are protected against a too strong effect of the sun. For in other places and even on the opposite side of the valley the conditions are quite different, as we shall see.

Directly behind Guredshik the gorge expands into the large cultivated plain of Zernovo. At the mouth of the gorge one observes on the slopes some small and open stands of *Pinus nigra*, otherwise everything is covered with a thin šibljak vegetation.

In Zernovo we stayed only a short time and returned soon to the small village of Guredshik where the commandant, Captain Stolingas, received us very hospitably. In the afternoon we investigated the steep slopes of north-north-western exposure above the village at an altitude of 800–1000 m. First we passed the much neglected cemetery which contained



Fagus sylvatica L.
Forest on the Kodsha Jaila, Thracia

an *Abies* and some *Castanea vesca* and *Carpinus betulus*, apparently the remnants of a mixed Fir and hardwood forest. I did not see any other *Abies* on these slopes, probably because everything has been cut down and the Firs could not regenerate. There are also some old *Juglans regia*, while farther up the continuous exploitation makes the development of trees impossible and a dense mixed brushwood prevails in which frequently the Beech predominates, but in places where elements dominate which stand more heat and drought than the Beech the wood gives the impression of a true šibljak formation. I noted the following woody plants on this slope: *Fagus sylvatica*, *Corylus avellana*, *Carpinus duinensis*, *Fraxinus Ornus*, *Crataegus* sp., two or three species of *Rosa*, *Cornus*, *Acer*, *Juniperus communis*, *Ligustrum vulgare*, *Pyrus* (*Sorbus*) *torminalis*, *P.* (*Sorbus*) *Aria*, *Populus nigra*, *Viburnum Lantana*, *Clematis* and a large number of herbs and perennials.

On the following day we went to Volak (on the Austrian map also called Olak), situated easterly in direction from Guredshik in the interior of the Boz-dagh. The slopes and ridges of mostly southern, southeastern or southwestern exposure on which the road runs uphill and downhill, are almost exclusively covered with a thin or occasionally denser šibljak vegetation consisting only of elements which stand heat and sun, while Beech and similar species are lacking entirely. The essential elements are *Juniperus Oxycedrus* (very common), *J. communis* (rarer), *Carpinus duinensis*, *Acer monspessulanum*, *Fraxinus Ornus*, *Quercus lanuginosa*, and farther toward Volak we meet for the first time on the journey *Syringa vulgaris* which forms at about 1000 m. altitude on the slopes of a small dry side valley fairly extensive growths. A solitary *Quercus coccifera* grown into a small tree not far from Guredshik reminds us once more that the Mediterranean region ends here. The last limestone ridge about 1100–1200 m. altitude which we have to cross before reaching Volak is nearly devoid of shrubs but instead covered with an interesting heath-like rock vegetation ("Felsenheide") consisting of *Artemisia*, *Achillea*, *Anthemis*, *Satureja*, *Minuartia verna*, *M. setacea* and others.

These slopes belong to the same valley system and to the same altitude (about 850-1200 m. according to the Austrian map) as those of which we described above the Beech brush-wood, but they are exposed to the South, while the Beech slopes are of northern, northeastern and eastern exposure. In addition to this there is a not unimportant topographical difference; the Beech slopes are much steeper and situated directly above the brook of the Derbend Deresi (Kopatshikovitza) which even during the summer carries some water. Therefore they are protected against the rays of the sun and benefit by the evaporation of the brook. The slopes, however, which we are traversing now are more gently curved and thus deprived of the beneficial influence of the brooklet and are, moreover, exposed to the pitiless rays of the southern sun. These small differences in the situation cause the purely Middle-European Beech forest to extend

farther down than the šibljak formation which is for this region more characteristic. According to their summer temperature these slopes would be suitable to sustain *Quercus coccifera* maquis, but this is excluded probably by the low winter-temperature which reigns in this region. During the winter the country down to Guredshik seems to be covered for a long time with snow which induces one part of the inhabitants to move for the winter into the Thracian plain.

Volak is not, as represented on the Austrian map, situated on the slope of one of the summits of the Boz-dagh, but west of the village where a chain of hills separates it from the Derbend Deresi and its tributaries. It lies therefore in a long and broad basin nearly filled out by the talus-cones of the adjoining high mountains united under the name Boz-dagh. According to the Austrian map its altitude is 1200 m., but this seems to be too high. If the altitude for Guredshik is correct, then that for Volak would be only about 1000. The teacher of the village gave the altitude as 820 m., but I do not know upon which measurement this figure is based.

I tried now to obtain information regarding the Fir forest in the mountains, since from below one could see only hard-wood forests. All the inhabitants said that there were no Firs in the whole mountain, but finally I asked the head of the village council and he gave me the necessary directions. The next morning we started out accompanied by a heavily armed gendarme (chorophylax) to ascend the Boz-dagh.

Slowly ascending our road lead us first on to the talus-cone which fills the valley toward southwest. Round the village all the ground is cultivated, chiefly maize and tobacco, which now are already harvested; the fields are very stony. Farther up šibljak-like formations prevail, in which *Juniperus communis* and *J. Oxycedrus* play the major part, intermixed with *Prunus spinosa*, *Cornus*, *Acer campestre*, *Rosa* etc. Later scattered smaller and larger trees of *Pinus nigra* enter into this formation. After about an hour we leave the valley and turning to the right we ascend the slope of the southwestern ridge by an often very steep zig-zag path. With the beginning of the firm rock the vegetation changes entirely. The whole slope is covered with a dense hardwood forest, which, however, on account of human interference, has assumed the character of a brush-wood. It is to a great extent pure Beech forest plentifully interspersed with *Corylus avellana*, and the whole wood presents the appearance of a uniform mixed wood of Beech and Hazel. This wood is impenetrable and only along the roadside one notices some Roses as additional shrubs. But in other places, as we shall see later on, the wood may contain a greater number of other shrubs. At about 1500 m. altitude there appear some clearings in the forest where *Pinus nigra* has established itself, so that the upper region represents a mixed forest of Beech and Pine which, however, occupies only a narrow zone, for soon the Beach disappears and the Pine forms open or occasionally dense stands frequently inter-

rupted by clearings which are occupied by grassy meadows or covered with a heath-like vegetation on rubble or rock consisting over wide stretches of an *Artemisia* (see plate 8).

Pinus nigra forms the forest and tree line at an altitude which varies on the several summits between 1650 and 1750 m. Above the tree line everything is much browsed and the slopes are much modified by numerous cattle paths which lie in close proximity one above the other. Shrubs are only sparingly seen as low bushes, occasionally a *Pyrus* (*Sorbus*) *Aria* and a *Cotoneaster*, otherwise only *Thymus* and a *Globularia*. At 1700 m. altitude the meadows rich in herbs and poor in grasses are replaced by two grasses, *Festuca* and cf. *Brachypodium*, which grow in hillocks and have leaves so hard that they are not eaten by the sheep. In these hard cushions which cover whole hillsides some pretty perennials find protection from the teeth of voracious animals. Toward the summit this grass formation reaches an upper limit and is replaced by herbs and perennials (*Androsace*, *Saxifraga* and others) which grow plentifully as open formations in the rubble and gravel and in the crevices.

We did not return on the ridge along the valley of Volak, but descended directly into the end of the valley which is closed by a slope rising abruptly and very steeply. From the upper crest of this slope starts the ridge on which we made the ascent in the morning through the Beech forest. From the south a similar valley has eaten itself into the mountain and this watershed forms a not very broad crest from which one has on two sides extensive views. Particularly interesting is the view into the deep and broad, basin-like valley of Volak. The steep incline just before us is treeless, the slopes of northern exposure to the left bear the Beech forest and above the Pine forest, but the slope to the right which is exposed to the sun during the whole day is down to the bottom of the valley covered with a very thin stand of *Pinus nigra* which are placed so far apart that one can hardly speak of a forest but rather of solitary trees. These two opposite slopes do not differ in their grade nor in the subsoil, only the exposure seems to produce the great difference in their vegetation.

Where the Beech forest stops at the foot of the steep incline at the end of the valley, some Firs are said to occur between the Beeches. Therefore, we have to descend the steep slope. First we pass the large hillocks of grass between which with other herbs rise some gigantic Umbelliferae. Then we notice large patches of dark green color with small evergreen leaves and red berries: *Vaccinium Vitis-idaea* which we hardly expected here. Soon we meet low scrub of Roses with red and black fruits and here and there one sees a dwarf shrub of *Pyrus* cf. *Aria* and a few *Pinus nigra* appear. As soon as the grade becomes less steep we have to go through a very dense brush-wood of *Corylus avellana*, before we reach the mixed forest. Already we noticed some large Firs over-topping the Beeches, but they are only a few, hardly a dozen, which here in that extreme corner of the forest (about 1400 m. alt.) could save themselves

from the axe. On the relationship of this Fir I shall report later; it is very probable that it belongs to *Abies Borisii regis*. The Beeches are here fairly tall but still bushy and form a very dense and impenetrable wood. Between the many slender stems of the Beech scattered young Firs and many low shrubs are crowded, as: two species of *Evonymus*, *Pyrus* (*Sorbus*) *torminalis*, *P.* cf. *domestica*, *Viburnum*, *Rosa*, *Corylus*, *Lonicera*, *Cornus* and at the margin *Acer campestre* and *Clematis* cf. *Vitalba*.

The valley forms an upper level here and its bottom is groove-like incised between the two widely diverging slopes. This groove sharply separates Beech and Pine. On one side is the dense Beech wood and the first step out of it brings us in a heath-like formation ("Felsenheide") which over wide stretches consists here again of an *Artemisia* and alternating with the hillock grasses occupies large areas between the scattered Pines. Somewhat farther down the valley bottom becomes moister and the Beech wood extends over the whole narrow valley bottom and harbors, thanks to this moisture, a luxuriant herbaceous flora. But this condition prevails only for a short distance, for soon the valley becomes broader and the talus-cone which we already know begins; here and there one sees some scattered Pines, but they too soon disappear and the last part of our way leads us again through the šibljak vegetation which we had passed already in the morning. The above mentioned swampy condition is only local and nowhere leads to the origin of a spring and much less of a brook. Even the shepherd who has established himself near the Firs has to bring up his drinking water from Volak. Therefore, it is not possible to explain the formation of the valley by the present water conditions.

Since we could not take our plant presses with us during this expedition on account of the uncertain conditions and the bad roads, we returned the following day to Drama. On September 24 we took the train from Drama to Komatini (Gumuldshina) little suspecting that this would be our last excursion of the year.

The ride on this railroad is much more interesting than that from Saloniki to Drama, since it crosses one part of the southern Rhodope Mountains. The low hills and the lower slopes are covered up to the entry into the mountains with the same meagre *Quercus coccifera* maquis as the corresponding regions on the Boz-dagh. The railroad climbs gradually higher and at an altitude of about 250 m. the hills are closer together and the railroad enters the valley of the Doksat tshaj. Here we leave the evergreen formations behind and *Carpinus duinensis* and *Paliurus aculeatus* prevail, the former often quite pure over long stretches. Both are already resplendent with their autumn colors. At 322 m. altitude the watershed is reached and we go down to the Mesta in whose valley the most attractive part of the train ride lies. All the slopes are covered with šibljak vegetation in which the just mentioned species play the major part. Not infrequently occur also *Quercus lanuginosa*, *Q. conferta*, *Q. cerris*, *Fraxinus Ornus*, *Ligustrum vulgare*, *Cornus*, *Syringa*

vulgaris, *Juniperus* (apparently *J. communis* and *J. Oxycedrus*), *Ulmus campestris*, *Prunus spinosa*, *Pyrus amygdaliformis*. The mountains south of the railroad rise to 1351 m. and are often wooded. Among the dense foliage we seemed to recognize the white shining leaves of *Tilia tomentosa*. Near Jenikoj at 86 m. altitude the Mesta valley widens for a short distance, only to close again into a narrow gorge. In this wide section of the valley begin to appear the evergreen shrubs which came up from the South along the Mesta. The first Mediterranean shrub, we encountered, was not as might be expected *Quercus coccifera*, but *Phillyrea media* which penetrates of all Mediterranean woody plants farthest into the flora of Middle Europe. Soon, however, it is joined by *Quercus coccifera* and other shrubs. The broad bed of the brook harbors a luxuriant vegetation consisting of *Populus nigra*, *P. alba*, *Alnus glutinosa*, three or four species of *Salix* often forming extensive thickets, *Ulmus campestris*, *Platanus orientalis*, *Rubus*, *Vitis sylvestris*, *Humulus lupulus*, *Sambucus Ebulus* and others.

We enter now the eight to ten kilometers long gorge of the Mesta river. The slopes drop to the river at a very steep angle and therefore are difficult of access. Besides larger settlements seem to be lacking in the near neighborhood: these circumstances have largely preserved the natural vegetation of these slopes which seem to deserve a closer examination. A dense, though probably for edaphic reasons, rather low wood extends over all the slopes. The trees have partly low trunks, but also shrubby growth is very common. A great number of various elements seem to be represented in this wood and the whole formation gives the impression of being a mixture of maquis, šibljak, and evergreen and deciduous high forest. From the train we noted the following woody plants: *Quercus coccifera*, *Q. lanuginosa*, *Phillyrea media*, *Olea europaea* (wild form), *Pistacia Terebinthus* (also *P. Lentiscus* but we are not certain, though we believed we recognized it sometimes), *Ficus Carica* (mostly shrubby), *Erica arborea*, *E. verticillata*, *Juniperus Oxycedrus*, *Cercis Siliquastrum*, *Cistus* cf. *creticus*, *Syringa vulgaris*, *Fraxinus Ornus*, *Rosa* sp., *Coronilla emeroides*, *Paliurus aculeatus*, *Rubus*, *Ephedra campylopoda*, *Clematis*, *Vitis sylvestris* and doubtfully *Celtis* and *Arbutus*. It is terrible to observe how *Robinia pseudoacacia* intrudes every where, particularly along the railroads and the water-courses, into the natural formations; it has ruined phytogeographically the whole valley of the Varda in southern Serbia.

The gorge ends at Taxotai (Oktshihar) and here the railroad turning toward east leaves the valley of the Mesta and at the same time emerges from the mountains and runs along the southern foot of the Rhodope Mountains, crossing gentle hills which occasionally nearly flat, are apparently the talus-cones of the mountains. From the spot where we left the mountains almost to Xanthi a true heath formation covers all the hills crossed by the railroad; they are tinged bright rose by *Erica verticillata* which is in full bloom, with red-brown patches between formed by *E. arborea* which is not in blossom now. I have never seen in the Balkan

peninsula these two species of *Erica* covering such an extensive area without admixture of other elements. Then follow large growths of *Paliurus aculeatus*, but round Xanthi there are only tobacco fields. The northern end of the lake Buru Golo, which the railroad approaches rather closely is surrounded by lowland forest consisting of the usual elements. Afterward the railroad runs nearer to the mountains of which the lower slopes sustain a meagre phrygana formation and then again through tobacco plantations, harvested fields, pastures and extensive thickets of *Paliurus*. In the fields one notices frequently Mulberry and Walnut trees and scattered Oaks and *Pyrus amygdaliformis*. At the left the Karlyk Mountain 1900 m. high rises steep from the plain; the lower slopes and its spurs are covered with a *Quercus coccifera* maquis; over it follow Oak forests and above appear coniferous forests which according to information received afterward in Komotini consists of Pine (pefki, probably *Pinus nigra*). Firs are said not to occur there, but this is certainly an error, for Dingler has collected *Abies alba* on the Karlyk, and recently I received from Professor Stojanoff *Abies Borisii regis* from the same mountain, though from the Bulgarian side.

The two following days we spent at Komotini attending to the formalities with the authorities and caring for our collections from the Boz-dagh. On September 27 we started on a four days excursion to Kodsha Jaila. The first station was Puntviran (Putviran, Ueuren) situated east-northeast of Komotini in the mountains and in the valley of the Uzon Oluk Dere. Here is stationed a military post where we were very kindly and hospitably received. The officers placed their horses at our disposal and provided us with a military escort for protection and guidance; also one or two officers accompanied us all the time.

The road runs from Komotini first eastward along the southern end of the Rhodope Mountains over rubble slopes and gentle hills. As soon as the vineyards are left behind, extensive very meagre and thin growths of *Paliurus aculeatus* alternate with entirely grazed meadows. Farther east the hills become higher (about 200 m.) and soon *Quercus coccifera* appears as a low shrub between the *Paliurus*, becomes gradually more frequent and soon gains the upper hand. At the same time *Juniperus Oxycedrus* becomes frequent and somewhat higher up also *J. communis*. At the beginning of the mountain the road leads rather steeply upward to about 300 m. altitude to continue at the same height above the Uzon Oluk Dere to Puntviran. As soon as the mountain begins, which consists of primary rock as far as the Kodsha Jaila, *Phillyrea media* appears and quickly becomes quite common. The slopes above the river are covered throughout with this maquis of *Quercus* and *Phillyrea* in which *Paliurus* is much repressed. On the other hand *Carpinus duinensis* is rather common and also *Pistacia Terebinthus* is not rare. At an altitude of 250 m. some high-stemmed deciduous Oaks, *Quercus conferta* and another probably a form of *Q. lanuginosa*, appear. At the same time elements

of the šibljak formation enter into the maquis, particularly *Acer monspessulanum* and *Fraxinus Ornus*, but the character of the true maquis formation is maintained up to Putviran (about 300 m. altitude and 5 kilometers distant from the mountains).

Putviran is situated at the border, which is of course labile, between the Mediterranean maquis and the Illyrian-Pontic Oak zone. Of this fact we saw a particularly instructive illustration when we were invited for a horseback ride to Karidere, some kilometres northwest of Puntviran. We went from Puntviran at first deep down to the river and then as high up and somewhat down again. On the ridge and on the slopes a mostly high Oak forest forms a more or less open upper story; *Quercus lanuginosa Q. conferta*, *Q. cerris* and perhaps a fourth species are growing variously mixed and represented by forms which would need a study of weeks to interpret them. The undergrowth, however, still consists mostly of maquis vegetation chiefly formed by *Phillyrea media*, while *Quercus coccifera* has become of less importance. Of evergreen elements only *Pistacia Terebinthus* joins these two, if we disregard the two species of Juniper mentioned above. Of deciduous species are again frequent: *Carpinus duinensis*, *Acer monspessulanum* and *Fraxinus Ornus*. Sometimes, particularly on steeper places, the Oaks are lacking and then the maquis formation predominates. On the other hand the Oak forest sometimes becomes so dense, that no space and no light is left for the evergreen maquis shrubs. On the river itself Lombardy Poplars, Willows and Alders have established themselves.

The same conditions were observed, as we rode the following day from Puntviran in the valley of the Uzon Oluk Dere northward. Already a few hundred meters behind the village *Quercus coccifera* stops entirely and leaves the field to *Phillyrea media* in company with the already mentioned šibljak shrubs. Also *Quercus lanuginosa* is not rare in shrubby form. The deciduous Oaks appear now more frequently as high-stemmed trees and form denser and more continuous forests which consist chiefly of *Quercus conferta* and a species similar to *Q. sessiliflora*, while *Q. cerris* appears only scattered as an incidental element.

The road crosses many gorge-like side-valleys in a steady up and down. In these somewhat moist and shade gorges exists a particularly luxuriant vegetation. Remarkably regularly appears in such places *Juglans regia* which otherwise is lacking in the forest, and nearly with certainty one can expect here some Figs, but always as a shrub never as a tree. In general one finds this tree in Thracia in places where it grows wild or naturalized mostly always in shrubby form, while trees are seen only in gardens, as e.g., in Puntviran where the Fig still bears good fruit.

As a third new element the Grape-vine climbs over the crowns of the trees and thus strengthens the impression of particular luxuriance of the vegetation in these gorges. These three ligneous plants which enrich the localities mentioned, are most likely wild in Greece and also in a

part of the northern Balkan peninsula, but all three at the same time belong to the most important cultivated woody plants of these countries. It seems therefore in spite of their regular occurence in the gorges, somewhat doubtful whether they are wild in these places. For just here water is present in the shape of springs or small brooks and provides inviting resting-places. It is easily imaginable that these plants owe their existence to remnants of meals thrown away by the peasants on their way to or from the market.

In contrast to these gorges the ridges projecting toward the river often end in steep cliffs and thus sunny, warm and dry localities are provided in which the mixed maquis and šibljak formation can attain its full development. It consists still of the same elements: *Phillyrea media*, *Carpinus duinensis*, *Fraxinus Ornus*, *Acer monspessulanum*, *Cornus*, *Juniperus Oxycedrus* (with *Arceuthobium*) as the chief components; besides these occur: *Pistacia Terebinthus* (beyond Puntviran already very rare), *Rubus*, *Rosa*, *Crataegus* cf. *monogyna*, *Paliurus aculeatus*, *Pyrus amygdaliformis*, *Cistus* cf. *creticus*, *Clematis* cf. *Vitalba*.

About 4–5 kilometres north of Puntiviran the road descends to the river (about 200 m. altitude), which is formed here by the junction of two streams. Here ends almost abruptly the abundant shrubby vegetation. The evergreen elements disappear definitely; only the slopes of southern exposure which belong to the ridge rising rather steep in the angle between the two rivers, bear in their lower parts still abundant scrub in which *Cistus* predominates, also *Carpinus duinensis* is still there and very rarely *Phillyrea media*. This confirms the experience already made once that the last named species extends farther into the Middle-European flora than *Quercus coccifera* which on the other hand ascends in the Greek mountains to higher altitudes than *Phillyrea*. In some places *Quercus coccifera* also will push farther north, as seems to be the case on the Boz-dagh. In regard to their ecology the two species are certainly very similar, but a small difference seems to exist in so far as *Quercus coccifera* is much less particular than *Phillyrea*. Therefore in too hot and dry localities *Quercus coccifera* is not associated with its otherwise loyal companion and forms in such places solely the boundary of the Mediterranean flora in far as it concerns the ligneous vegetation. In more favorable localities, however, as near Puntiviran, the *Phillyrea* seems to be more able to compete with the deciduous shrubs than *Quercus coccifera* and therefore it can advance farther than that species.

Ascending on the ridge between the two affluents of the Uzon Oluk Dere, the path turns in northeasterly direction and takes us to Hamidli (about 400 m. alt.) and then leaving this valley system we reached Tshalapi Jajlasi (about 700 m. alt.) at noon. This whole wide hilly country is exclusively dominated by Oak forests in which *Quercus conferta* and *Q.* cf. *sessiliflora* alternately predominate and form either pure or mixed woods. *Quercus lanuginosa* has become rarer, but *Q. cerris*, though still

rather rare, is found more or less regularly in scattered solitary individuals Undergrowth is entirely lacking in these extensive woods, if one does not take into consideration the young growth of these Oaks which is present now more plentifully and now more sparingly. Only along the way one sees occasionally a Rose and of herbs there is at this season little to be seen, but the wood is often so dense that it is doubtful, if it harbors many more even at a more favorable season of the year. The Oaks are plentifully infested by *Loranthus europaeus*, often so densely, that one wonders that there are not more dying trees. The brooks are accompanied by fairly large stands of *Alnus glutinosa*.

This mountainous territory is sparsely settled and the few existing villages are small. Carriage roads do not exist and Puntviran is the terminal of the state road coming from Komotini. This circumstance alone is the reason that the large Oak forests still exist and over wide stretches are entirely untouched. I fear, however, that their years are numbered. In the immediate neighborhood of the villages the trees have been cut already. This is the case near Hamidli and Tshalapi Jajlasi, but between the two places and beyond the latter there stretch monotonous Oak forests. At the right of the path, however, also the mountains which rise up to 850 m. altitude are treeless and covered thinly with a scrub of *Juniperus communis* and *J. Oxycedrus*. Whether this is their natural condition or—what is more probable—the consequence of exploitation, I could not decide. Besides maize the inhabitants of the villages grow on their small fields some grapes which are rather sour.

After having eaten the obligatory fowl in Tshalapi Jajlasi at the house of the commandant of the place who had been advised of our coming by telephone, we continued our ride via Musadjik to Halilviran (Hebilkoj, about 950–1000 m. alt.) which we reached at nightfall. The path went several times steep down to the river and as steep up again on the other side. This very much intersected territory causes naturally a change of vegetation, though neither the formations nor their elements present anything different from what we had already seen. The slopes directly behind Tshalapi Jajlasi are perfectly bare, only when we go down to the river toward Musadjik, Oak forests appear in which *Q. conferta* predominates interspersed with *Q.* cf. *sessiliflora*, while *Q. lanuginosa* and *Q. cerris* are lacking. The opposite ridges bear only meagre šibljak vegetation consisting of *Juniperus communis* and *J. Oxycedrus*. A change between these few monotonous formations is all we encounter. We are not going directly to the village of Halilviran, but ascend a ridge extending down from the Kodsha Jaila (Chodja, Chodsha or Kodja Jaila or Jajla), on which a military commando is stationed where we are hospitably received. At about 800–900 m. we reach on this ridge the upper limit of the Oak forest; above it the broad arched ridge is covered with Juniper-scrub and pastures.

The following day we ascended the summit of the Kodsha Jaila (1295 m.

alt.), to which our ridge directly leads. First of all we notice that the zoning as stated above applies only to a part of the southern slope. On the northern slope follows over the Oaks first a broader or narrower zone of Fagus, which here forms pure and impenetrable brush-woods and above these follow the thin and interrupted scrub of the two Junipers. On the bare ridge we ascend slowly but steadily. Before us rises the steep and high wall of the Kodsha Jaila which its whole length and breadth is covered with Beech woods. Toward the right, i. e. toward south and southwest, we see extensive mountain ridges which do not exceed 800–900 m. altitude. These are exclusively dominated by Oak forests, while Beech is lacking entirely. If we had not traversed these mountains and their forests, it would have been difficult for us to recognize from such a distance physiognomic differences between the Beeches and the Oaks.

Soon the shrubby Beech woods extend from the south up to the ridge. As soon as we reach, at the end of the ridge, the Kodsha Jaila which runs across it, the true Beech forest begins. It is a beautiful dense high forest, and it is quite pure without admixture of any other tree (see plate 9). Numerous seedling plants form a lower shrubby story and in spite of our diligent search we are unable to detect a single shrub of another species. The individual trees form fine trunks, but yet this forest is in its appearance different from the Beech forests of Middle Europe. First of all the trunks are not quite so tall and thick as in Germany and the individual trees consists often of two or three or sometimes more stems of equal thickness arising from the very base. This cannot be the effect of cutting the original trees, for one can find in the whole forest not the slightest evidence of human activity and the officers stationed in the vicinity assured us that the forest was untouched, because it is difficult of access and no roads whatsoever exist to cart away the timber. Besides the Greek-Bulgarian border runs across the crest of the Kodsha Jaila which perhaps protects the forest more than anything else. This goes to show that the form of the forest is a perfectly natural one. As regards the height, the thickness and the division into many stems of the trees, this forest is in this respect as intermediate between the German and southern-most Beech forest on the Oxya Mountain as it is by its geographical position. The Beech forest extends nearly to the summit, but the individuals near the top assume under the influence of the wind the form of a dense many-stemmed bush and thus become similar to the Beeches of the Oxya Mountain. Only a narrow crest of the ridge is treeless. On the northern Bulgarian side a dense high Beech forest extends again far into the valleys, but the endless mountain ridges rising side by side northward from Mandritza and Ortakioj to the northern margin of the Rhodope Mountains near Svilengrad (Mustapha Pasha) which I had traversed two years ago, are completely free of Beeches. Only the higher mountains, above 1200 m. altitude, offer to the Beech here at the southeastern limit of its distribution suitable localities; even on these the tree inhabits only the uppermost

region which is yet favorable to tree growth and only occasionally *Pinus nigra* as on the Boz-dagh ascends still higher.

From Haliviran we returned not directly by the way of Musadjik, but turned toward Hadjiviran and thus had an opportunity to see on the northwest and north side of the ridge on which the above mentioned military post is situated, the lowest part of the Beech forest. At 850 m. altitude we still find beautiful dense stands of Beech, but at this altitude they include already scattered trees of *Quercus* cf. *sessiliflora*. It is a small gorge-like valley in which the Beeches descend as far down. Whether they do this also on the slopes I was unable to observe. At any rate this mixture of Beech and Oak looks strange after one has seen extensive pure stands of these two trees. Gradually the number of Beech trees diminishes at the same rate as that of the Oak trees increases and below 750–800 m. the Oak forests are again quite pure. We see here again the usual picture; everywhere Oak forests, alternating with occasional bare summits overgrown with a thin Juniper-scrub.

Now a few words regarding the chief purpose of our visit to the Kodsha Jaila which was undertaken in the hope to find here a Beech intermediate between *Fagus orientalis* and *F. sylvatica*. Although it was already rather late in the season, we succeeded in finding some trees which still bore fruit and we also could gather plenty of fruit on the ground, but much as we looked we were unable to detect any cupula with foliaceous appendages. All represented typical *Fagus sylvatica*, even if the leaves sometimes resembled somewhat those of *F. orientalis*, but the leaf characters are too unstable as to afford characteristic distinctions. We have to assume that the Beech which Dingler collected 50 years ago in these mountains was an accidental or perhaps monstrous form. In the meantime, however, Professor Stojanoff and Stefanoff have discovered (according to information in a letter) on the Bulgarian side of the Rhodope Mountain true *Fagus orientalis*. It always grows in the deep moist gorges in the Fir region, that is below *Fagus sylvatica* which grows in the higher regions of the same mountains and forms transitions to the former possibly of hybrid origin. Such an intermediate hybrid form was probably the Beech collected by Dingler. *Fagus orientalis* should be looked for on the Kodsha Jaila in the deep gorges of the Bulgarian side.

We returned to Puntviran by the same way we came and arrived in Komatini on October first. The following day we returned to Saloniki. After having pressed and dried the collected material we intended to make a hurried excursion into Bulgaria to collect at least *Abies Borisii regis* and *Fraxinus Pallisae*, but Mr. Schultz was taken vehemently sick with malaria tropica. This prevented us making the excursion and kept us in Saloniki until October 26, when he had sufficiently recovered, so that we could leave beautiful Greece, where we had been so hospitably received, and return to Berlin.

BOTANISCHES MUSEUM, BERLIN-DAHLEM
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MORUS ALBA AND ITS ALLIES IN THE HERBARIA OF LINNAEUS, THUNBERG AND OTHERS.

T. NAKAI

THE most important product of Japan is silk, obtained from silk-worms fed on mulberry-leaves. *Morus alba* of the present botanists and *Morus multicaulis* Perrottet are principally used for the purpose. These plants cannot be grown in the oceanic islands where they are exposed to the spray of the sea-water, but *Morus bombycis* var. *maritima* Koidzumi, *Morus Kagayamae* Koidzumi, and *Morus acidosa* Griffith are substituted for them. In Liukiu *Morus acidosa*, in Dagelet Island of the Japan Sea *Morus bombycis* var. *maritima*, and in the Idzu Archipelago *Morus Kagayamae* are used for sericulture. The Island Administration of Dagelet has made great efforts to cultivate other kinds of Morus, but the sea-wind has always proved fatal to the new comers.

I. LINNAEUS' MORUS

Morus alba of Linnaeus is a compound species. In Species Plantarum, p. 985 (1753) Linnaeus used the name *Morus alba* and the description "foliis oblique cordatis laevibus" which he already had used in his Hortus Cliffortianus, p. 441 (1737) follows. He used also the same description in his Flora Succica, p. 283 (1748). The native habitat of *Morus alba* as indicated by him differs in these three books. In Hortus Cliffortianus it is designated as "crescit in Italia," in Flora Succica as "in China & Italia," and in Species Plantarum as "Habitat in China." It is certain that he had seen cultived plants in Holland, before he had written his Hortus Cliffortianus. These may have been conspecific with the white-fruited Morus cultivated in South Eutope for sericulture, and which is generally considered the type of Linnaeus' *Morus alba*. This is the Morus which R. Dodoens figured as *Morus candida* in his Stirpium historiae pemptades, p. 798, fig. dextra (1583), and which J. H. Bauhin called *Morus alba* in his Historia Plantarum Universalis, I. 120 (1650). Linnaeus had the Chinese specimens of Morus collected by Pehr Osbeck, but it is quite uncertain whether he had seen them before the publication of his Flora Succica. He had them when he wrote his Species Plantarum. According to my opinion, at the time of the publication of Species Plantarum, Linnaeus must have believed that *Morus alba* was not indigenous in Europe, and also that the specimens of Osbeck were conspecific with *Morus alba* of Bauhin. Therefore he concluded that *Morus alba* is a native of China, not of Europe. Linnaeus' specimens are in the rooms of the Linnaean Society of London and in Riksmuseet at Frescati near Stockholm. The specimens of *Morus alba* in the Linnaean Society consist of four fruiting branchlets and a sterile one. The one specimen in Riskmuseet is sterile. The four pieces of fertile branchlets belong to the same species, *Morus alba;* they differ from the sterile

branches both in the Linnaean Society of London and in Riksmuseet at Frescati. The sterile branches have stiff-haired petioles and veins as we see them in *Morus acidosa;* the leaves are broad and have roundish dentations. These branches represent a distinct species, but without flowers and fruits we cannot tell whether they are a species or a hybrid of known species. This question requires further investigation, hence for the fertile specimens the name of *Morus alba* should be retained for present. *Morus italica* of Poiret (in Lamarck, Encyl. Méth. IV. 377, no. 3 [1796]) resembles the sterile branches yet the leaves are more softly and densely hairy.

The specimen of *Morus tatarica* consists of one fruiting branch, collected at Assoff (Azow near the mouth of the river Don). It has reddish-brown biennial branches and annual branches with short yet spreading hairs, long adpressed-velutinous petioles, ovate or elliptic leaves with coarse serrations and perfectly glabrous veins, nearly roundish clusters of fruits, and two stigmas without style. This is nearest to *Morus tatarica* figured by Pallas in his Flora Rossica I. pt. 2, t. 52 (1788). Thunberg had a specimen sent by Pallas which Pallas collected in Tauria (Crimea of to-day). It is a fruiting specimen just like the figure of Pallas. The British Museum has nearly all the collections of Pallas, but *Morus tatarica* is lacking. Therefore the specimen in the Thunberg herbarium should be the type of Pallas' plant. It has grayish brown biennial and glabrous (glabrescent?) annual branchlets, the petioles pilose along the upper groove, the leaves a little broader (a few of them show the same form as the type of Bureau's *Morus alba* in the Muséum d'histoire naturelle at Paris), the main veins of the under surface of the leaves with white spreading hairs along both sides, the perianth hairy at the apex and two sessile stigmas. This is a form of the *Morus alba* of to-day. Thunberg had collected a specimen of the same kind in Japan. A part of his *Morus indica* in his Flora Japonica, p. 76 (1784) or *Morus indica* L. (the left-hand specimen in his Herbarium) is also the same kind. This kind of Morus has innumerable forms. It may have varied by mutation or by crossing, yet the forms of Morus belonging to this category have invariably hairs of the following kind: petiole with white hairs along the upper groove and the hairs along both sides of the principal veins on the under surface of the leaves white and spreading. This makes them a part of *Morus alba* L. α. *vulgaris* of E. Bureau (in C. de Candolle, Prodr. XVII. 238 [1873]). Excellent figures are given in Koidzumi's Revision of genus Morus (1917) and in his Synopsis specierum generis Mori (1923).

II. THUNBERG'S MORUS

(a) *Morus alba*, Flora Japonica, p. 71.

This is a sterile branch of *Morus bombycis* Koidzumi (in Tokyo Bot. Mag. XXIX. 313 [1915]), with very sinuately cleft leaves. On the back

of the sheet it is designated as 'e Japonia: Thumberg. Incolis: Jamma Guwa.'

The vernacular name 'Yama-guma' is used throughout Japan. This species is one of the wild species of Japan and Korea and often used as a substitute of *Morus alba*.

(b) *Morus nigra*, l. c.

Thumberg had three specimens of *Morus nigra*, but none of them of Japanese origin. He recorded it as "crescit juxta Nangasaki" in his Flora Japonica, but what he meant is not clear.

(c) *Morus papyrifera*, l. c., p. 72.

This is *Broussonetia papyrifera* L'Hérit. Thumberg had four specimens, of which one is from Japan. It consists of two branchlets with female flowers and one sterile branch with opposite leaves.

(d) *Morus indica*, l. c., p. 76.

Thumberg had four specimens, of which two (α, β) are from Japan.

Specimen α consists of two branches; one is a fruiting branch of *Morus alba* with black berries; the other is a female flowering branch of *Morus bombycis* with the leaves not sinuate and pilose beneath.

Specimen β consists of two fruiting specimens of *Morus bombycis*.

Specimen γ is a fruiting specimen; on the back of the sheet is written "e Ceilona Thunberg." This has small tapering leaves like *Morus indica* of Roxburgh (Herb. Kew) which was collected by Mace at Coromandel. The same form was found by J. D. Hooker in Sikkim (Herb. Kew). In Muséum d'histoire naturelle at Paris there are three similar specimens: 1°, from Coromandel, Herb. Commerson; 2°, without locality, Herb. Jussieu; 3°, from India, without precise locality, collection of Jacquemont's voyage. The type of *Morus acidosa* Griffith (Herb. Kew) has much smaller dimorphic leaves, yet it is conspecific with *Morus indica* Roxburgh (non Linnaeus). Similar forms were collected by G. Watt at the eastern frontier of India (Herb. Kew), and by Leschenault in Ceylon (Herb. Mus. Hist. Nat. Paris). C. Schneider says (in Sargent, Pl. Wilson. III. 294 [1916]), "there is no indication of a Morus in any Flora of Ceylon." But we cannot overlook the existence of *Morus acidosa* in Ceylon as confirmed by the specimens of Thunberg and Leschenault. Bureau already recorded the Leschenault's specimen (in C. de Candolle, Prodr. XVII. 243, [1873]). It is unfortunate that *Morus australis* of Poiret (in Lamarck, Encycl. Méth. IV. 380, no. 9 [1796]) was reduced to *Broussonetia papyrifera* by Ed. Bureau (in C. de Candolle, Prodr. XVII. 248 [1873]) and in Ind. Kew. II. 266. C. Schneider (in Sargent, Pl. Wilson. III. 302, [1916]) considered it conspecific with *Morus latifolia* Poiret and *Morus intermedia* Perrottet, but this *Morus australis* is the oldest and valid name of *Morus acidosa* Griffith. The type-specimen consists of two fruiting branchlets. Poiret said that this was cultivated in the island of Bourbon. On the label Poiret wrote "*Morus australis*

Dic. no. 9." Linnaeus cited Rheede's Tinda Parua (Hort. Malabar. I. 87, fig. 49 [1686]) as a synonym of *Morus indica* in his Flora Zeylanica, 160 (1747), and in his Species Plantarum, 986 (1753). Other authors copied it: e. g. Willdenow, Species Plantarum IV. 370 (1805); Spach, Histoire naturelle des végétaux, XI. 47 (1842). The correct citation for Tinda Parua, however, is not figure 49 but fig. 48. It is not a Morus but *Streblus asper* Loureiro, Flora Cochinchinensis, 615 (1790). Since Linnaeus' *Morus indica* was based on Van Rheede's figure, it cannot be used as a name for a Morus. There is no specimen of *Morus indica* in the Linnaean Herbarium in the Linnaean Society of London nor in Riksmuseet at Frescati.

Specimen δ consists of two flowering female branches of *Morus acidosa* or *Morus australis* with very large leaves, but one of which has a lateral branch with leaves similar to the type of *Morus acidosa*. These were collected by Rottler at Coromandel.

Besides, Thunberg had one more Japanese specimen. He wrote "*Morus tatarica* L. e Japonia, C. P. Thunberg" on the sheet. It is a sterile branch with small leaves. The hairs on the main veins are very much like those of sterile branches of *Morus alba* of Linnaeus, but the upper surface of the leaves is sparingly setulose. Maximowicz had labelled it as "*Morus alba* L. var. *stylosa* Bureau" which includes *Morus indica* and *Morus bombycis*.

Morus Tokwa Siebold in the Rijksherbarium at Leiden is, as Miquel remarked (Prol. Fl. Jap. 130, [1867]), conspecific with *Morus multicaulis* Perrottet or *Morus latifolia* Poiret (in Lamarck, Encycl. Méth. IV. 381 [1796]). The specimens of *Morus Tokwa* are fruiting branches. *Morus latifolia* was sent to Lamarck by an unknown collector from the island of Bourbon where it was cultivated. The specimen consists of a sterile branch.

SUMMARY

(1) *Morus alba* of Linnaeus consists of two species; one is *Morus alba* of to-day and the other is an unknown species. The name of *Morus alba* should be retained for the former.

(2) *Morus tatarica* of the Linnaean Herbarium in London is distinct from *Morus alba*. *Morus tatarica* of Pallas is *Morus alba* Linnaeus.

(3) *Morus alba* of Thunberg is *Morus bombycis* Koidzumi.

(4) *Morus indica* of Thunberg from Japan is *Morus bombycis* Koidzumi, and from other countries it is *Morus australis* Poiret (*M. acidosa* Griffith).

(5) *Morus latifolia* Poiret is the earliest valid name of *Morus Tokwa* Siebold and *Morus multicaulis* Perrottet.

DESCRIPTION OF A NEW SPECIES

Morus scabriuscula Nakai, sp. nov.

Frutex; rami biennes rubescenti-grisei, glabri, lenticellis rotundatis vel elongatis punctati; rami hornotini virides, pilis albis tenuissimis adpresse pilosi; gemmae ovatae, squamis fuscis imbricatis obtectae. Stipulae subulatae vel lanceolato-subulatae, circiter 5 mm. longae, extus totae vel in medio ciliatae, intus glabrae; petioli circiter 1 cm. longi, toti tenuissime aequaliter piloselli; lamina inaequaliter triloba vel raro indivisa, interdum subquinqueloba, basi cordata, margine leviter incurvato-ovato-serrata, apice acuminata vel caudato-attenuata, supra viridis, glabra sed papillis cartilagineis sphaericis vel setulosis aspera vel scabra, infra pallida, venis primariis dorso sparsissime pilosis et circa basin ad latera patentim barbatis exceptis glabra. Flores masculi mihi ignoti; inflorescentia feminea brevissima, ambitu subrotundata; pedunculi minute tenuissime ciliati, 5–7 mm. longi; tepala dilatata apice ad marginem tantum pilosa, viridia, integra, rarius inferiora biloba; ovarium glabrum; stylus nullus; stigmata 2, incurva, intus papillosa.

In agris japonensibus rara.

I saw only one specimen of this new species in European herbaria. It is preserved in the Herbarium of the University of Upsala, Sweden, and was collected by J. F. Eijkman at Nagasaki.

Botanical Institute of Tokyo Imp. University
Koishikawa, Tokyo
May, 1927

AN ENUMERATION OF THE LIGNEOUS PLANTS OF ANHWEI

Alfred Rehder and Ernest H. Wilson

SUPPLEMENT

Juniperus formosana Hay. (p. 90); strike out no. 3023, which belongs to *Stewartia chinensis* Rehd. & Wils. No. 3023 may be a mistake for no. 3027 or 3029, numbers wanting in our herbarium, and if so, it was collected on the Wang shan, July 15, 1925.

Carpinus laxiflora var. **Davidii** Franch. (p. 95); add:

Li kan, Chemen, alt. 100 m., *R. C. Ching*, no. 3156, August 7, 1925 (tree 15 m. tall, diam. 55 cm.).

Castanea Henryi Rehd. & Wils. (p. 96); strike out no 4101 which should be changed to 4181 and is from Chekiang, not from Anhwei.

Before **Michelia figo** (p. 110) insert:

Manglietia Fordiana Oliver in Hooker's Icon. xx. t. 1953 (1891).

Wang shan, alt. 550 m., *R. C. Ching*, no. 2946, July 12, 1925 (tree 9 m. tall).

After **Benzoin reflexum** (p. 113) insert:

Benzoin erythrocarpum Rehder in Jour. Arnold Arb. I. 144 (1919).
Lindera erythrocarpa Makino in Tokyo Bot. Mag. XI. (219) (1897); XIII. 138 (1899).
Lindera Thunbergii, op. cit. XIV. 184 (1900).—Non *Benzoin Thunbergii* Sieb. & Zucc.

Chemen, *R. C. Ching*, no. 3198, August 13, 1925 (tree 9 m. tall, diam. of trunk 25 cm.; fruit bright red).

This species has not yet been recorded from China as far as I know. The specimen agrees well with specimens from Ogawa, Shinano province, Japan, collected by J. G. Jack, except that the leaves are scarcely glaucescent beneath.

Benzoin strychnifolium Kuntze (p. 113); add:
Chu hwa shan, north foot, alt. 300 m., *R. C. Ching*, no. 2768, June 26, 1925 (shrub 5 m. tall).

After **Benzoin strychnifolium** (p. 113), add:

Benzoin spec.
Chu hwa shan, *R. C. Ching*, no. 2595, April 28, 1925 (small tree 9 m. tall); Tien tai shan, alt. 1220 m., *R. C. Ching*, no. 2853, June 29, 1925 (tree 12 m., diam. of trunk 25 cm.)

The specimens cited above are characterized by the strongly lenticellate branches and the dense, villous, scarcely silky pubescense of the young unfolding leaves of the flowering specimen; no. 2853 which is in young fruit has its elliptic-lanceolate leaves only slightly pubescent on the veins and very sparingly on the veinlets. I have not been able to identify these specimens with any Benzoin known to me and have to defer final determination until mature fruit is available.

After **Rosa sertata** (p. 125) insert:

Maddenia hypoleuca Koehne in Sargent, Pl. Wilson. I. 56 (1911).
Chu hwa shan, *R. C. Ching*, no. 2727, May 3, 1925.

Zanthoxylum setosum Hemsl. (p. 150); add:
Chu hwa shan, *R. C. Ching*, no. 2725, May 3, 1925.

Evodia officinalis Dode (p. 151); add:
Chu hwa shan, *R. C. Ching*, no. 2779B, June 27, 1925 (dense shrub, 5 m. tall; bark grey; common).

Securinega ramiflora Müll. Arg. (p. 152); add:
Chu hwa shan, *R. C. Ching*, no. 2723, May 3, 1925.

Ilex purpurea Hassk. (p. 156); in the enumeration of specimens for "*R. C. Ching*, no. 3722" read "*R. C. Ching*, no. 3172."

Paliurus hirsutus Hemsl. (p. 165); in the first line of the last paragraph for "12–14 m. across" read "12–14 mm. across."

After **Berchemia Giraldiana** (p. 166) insert:

Berchemia floribunda Brongniart in Ann. Sci. Nat. x 357, t. 13, fig. 1. (Mém. Fam. Rhamn. 50) (1826).

Berchemia floribunda var. *megalophylla* Schneider in Sargent, Pl. Wilson. II. 213 (1914).

Chu hwa shan, *R. C. Ching*, no. 2724, May 3, 1925.

The specimen cited above differs somewhat from the six Indian specimens before me in the narrower gradually acuminate leaves green beneath and in the more leafy inflorescence, but otherwise I can see no difference. I also am unable with additional Chinese material at hand to retain Schneider's var. *megalophylla*, for the size of leaves varies in the Himalayan material as much as in the Chinese, e. g. R. R. Stewart's no. 2363 from Chamba, Punjab, has leaves up to 11.5 cm. long, while in at least four of the eight Chinese specimens in this herbarium the leaves do not exceed 7 cm. in length.

Vitis fagifolia Hu (p. 168); add:

Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2753, June 26, 1925 (trailing vine, 2 m. long).

Vaccinium bracteatum Thunb. (p. 185); add:

South Chemen, alt. 120 m., *R. C. Ching*, no. 3201, August 13, 1925 (shrub 6 m. tall).

Callicarpa Lingii Merrill (p. 193); for "Merrill, sp. nov." read "Merrill in Jour. Arnold Arb. VIII. 16. (1927)."—By mistake the original description accompanying the type specimen, which was loaned by Dr. E. D. Merrill to the Arnold Arboretum, was published a second time as a new species.

Gardenia augusta Merrill (p. 196); add:

North foot of Chu hwa shan, alt. 300 m., *R. C. Ching*, no. 2765, June 26, 1925 (dense shrub 2.5 m. tall).

After **Viburnum theiferum** (p. 197); insert:

Viburnum lobophyllum Graebner in Bot. Jahrb. XXIX. 589 (1901).—Rehder in Sargent, Trees & Shrubs II. 101, t. 148 (1908).

In his letter of September 2nd Dr. H. Handel-Mazzetti informed us that he had recently received a collection of plants made by Chien on the Wang shan in Anhwei and that this collection contained a number of species not mentioned in our "Enumeration of the ligneous plants of Anhwei" of which he had seen at that time only the first part. We hope to be able in a later issue of this Journal to publish a list of the species of the Chien collection not in our Enumeration.

NOTES

The Arnold Arboretum during the Fiscal Year ended June 30, 1927.

The Arboretum.—The weather of 1926 27 was most favorable for the living collections. No very low winter temperatures were recorded and frost did not penetrate to any great depth into the ground. December brought several heavy falls of snow but those of the other winter months were moderate only. The trees and shrubs suffered little or no winter injury. Good rains fell during spring and summer. On the whole it is long since the Arboretum enjoyed so favorable a season of plant growth.

In the spring fewer plants were placed in the permanent collections than usual, the most important planting being a new Prunus collection among the Betula group on Bussey Hill.

The autumn of 1926 was marked by an abundant display of colored fruits and autumn foliage. The 1927 spring display of Japanese Cherries was finer than usual, but of the Crabapples not more than forty per cent flowered. The Azaleas, Rhododendrons, and Kalmias blossomed in great profusion. The collections generally are in excellent condition. The Hybrid Lilacs were very severely pruned and to the great disappointment of the general public none blossomed. Thanks to favorable season and judicious feeding, the cut-down Lilacs have made splendid growth and there is reason to expect a display of blossom next year.

During the year 3006 plants (including grafts and cuttings) and 3422 packets of seeds were distributed as follows: to the United States, 2851 plants and 1189 packets of seeds; to Great Britain, 63 plants and 489 packets of seeds; to Canada, 21 plants and 496 packets of seeds; to Australia, 1 plant and 21 packets of seeds; to Finland, 114 packets of seeds; to India, 1 packet of seeds; to Holland, 29 plants and 52 packets of seeds; to Japan, 137 packets of seeds; to Sweden, 3 plants and 220 packets of seeds; to Germany, 3 plants and 184 packets of seeds; to China, 2 plants and 106 packets of seeds; to Denmark, 115 packets of seeds; to Russia, 140 packets of seeds; to France, 10 packets of seeds; to Czechoslovakia, 148 packets of seeds; to Ireland 17 plants; to Cuba 18 plants; to Tasmania, 1 plant and to New Zealand, 1 plant.

There have been received 1911 plants (including grafts and cuttings) and 781 packets of seeds as follows: from the United States, 1730 plants and 68 packets of seeds; from Great Britain 156 plants and 110 packets of seeds; from France, 31 packets of seeds; from Germany, 2 plants and 10 packets of seeds; from China, 228 packets of seeds; from Canada, 1 plant and 40 packets of seeds; from New Zealand, 103 packets of seeds; from India, 124 packets of seeds; from Sweden 9 plants and 15 packets of seeds; from Japan, 1 packet of seed; from Czechoslovakia 2 packets

of seeds; from Russia 42 packets of seeds; from Cuba 5 plants and 7 packets of seeds; from Ireland, 5 plants and from Manchuria, 3 plants.—E. H. W.

The Herbarium.—At the end of June the Herbarium contained 285,822 sheets, 9018 sheets having been added during the year 1926–27. Among the accessions about 1650 plants came from North America, about 920 from Central and South America, more than 1200 from Europe and Western Asia, about 1,400 from tropical and southern Africa, about 800 from China and about 1800 from Malaysia and Australasia. About 500 were cultivated plants and more than 1300 miscellaneous collections. As the most important single collections received may be mentioned about 900 plants collected by E. J. Palmer chiefly in Texas, Arkansas, Oklahoma, Missouri and Wisconsin, 257 plants collected by P. Dusén in Brazil, about 1200 plants from Europe and western Asia received from J. Bornmueller, 331 plants from Fukien province collected by H. H. Chung, 372 plants from Chekiang province through the National Southeastern University of Nanking, 1085 from Borneo collected by A. D. Elmer, 406 from South Africa collected by R. Marloth, 984 plants from Tropical Africa collected by D. H. Linder, and 577 plants from Papua collected by L. J. Brass. There have been distributed from the herbarium 5970 specimens among eight institutions in this country and in Europe.

Botanical exploration for the Arnold Arboretum has been carried on in different parts of the world during the year. The expedition to northwestern China and northeastern Tibet under Mr. J. F. Rock, was brought to a successful conclusion. Mr. Rock started from Choni, Kansu, in March, 1927 and arrived safely in Shanghai at the beginning of May and by June all the collected material, botanical and zoological, had arrived at Shanghai without the loss of a single parcel (see Journ. Arnold Arb. VIII. 200). The collection of plants amounted to more than 5000 numbers each number with many duplicates. Mr. Rock also sent to the Arboretum 601 different numbers of plant seeds, many of them in very large quantities. These have been distributed among 41 of the leading botanical gardens in this country, Canada and northern Europe. Assistant Professor J. G. Jack spent more than three months, from the middle of January to April, 1927, at the Harvard Tropical Garden, Soledad, Cuba, collecting for the Arboretum in the Garden and in the surrounding country. Mr. J. E. Palmer collected from July to October, 1926 in Texas and some of the adjoining states and explored the botanically little known Davis Mountains in southwestern Texas. Dr. D. H. Linder accompanied as collector for the Arboretum the Expedition of the Harvard Institute of Tropical Biology and Medicine which crossed the African Continent from Liberia to British East Africa, starting in October 1926, and reaching the eastern coast in May 1927;

he collected more than 2600 numbers of plants, most of them in duplicate. Dr. Joh. Mattfeld collected in Greece from May to October 1926 (see Journ. Arnold Arb. VIII. 133 and 205 for a detailed report) and started again for the Balkan peninsula in June 1927 to collect in Bulgaria. In Australia the Arboretum participated in the botanical exploration carried on by Mr. C. T. White for the Brisbane Botanic Garden. The collecting tour in the British Territory of Papua by Mr. L. J. Brass had already been terminated in June 1926.—A. R.

The Library.—Since the last report on the library made in this Journal (October, 1926) 653 volumes, 187 pamphlets and 886 photographs have been added, bringing the total to 37,146 bound volumes, 8,559 pamphlets, 200 unbound volumes of works coming out in parts, and 13,401 photographs.

The most valuable and interesting books added during the year are:

MIZAULD, (*Lat.* MIZALDU.) ANTOINE. Hortorum secreta. Lutetiæ. 1575.—Fine copy bound in vellum sheet of music. Antoine Mizauld (1510–78) born at Montluçon, was astrologer and physician in ordinary to Marguerite de Navarre.

KRAFFT, J. C. Plans des plus beaux jardins pittoresques de France, d'Angleterre et d'Allemagne. 2 vol. Paris. 1809-10.—Beautiful colored plates, and trilingual text. Rare. Gift of Mrs. Edith Appleby.

The PHILADELPHIA florist (continued as FLORIST and horticultural journal). [1852 55.]

COLONNA (*Lat.* COLUMNA), Fabio. Φυτοβασανος; sive, Plantarum aliquot historiae. Neapoli. 1592.—First edition of an important and rare book of plants which was reprinted in the 18th century. Graesse says this work is the first having figures of plants engraved on copper. The plates are very fine, in a brownish tone, surrounded by a printed border. Vellum binding.

PONS, Jacques. Medicus, seu ratio, ac via aptissimus, ad recte tum discendam, tum exercendam medicinam. Lugduni. 1600.—Bound in vellum.

——— In historiam generalem plantarum Rovillii. Lugduni. 1600.—Bound in vellum.

USTERI, Paulus. Delectus opusculorum botanicorum. 2 vol. Argentorati. 1790-93.

WALCOTT, Mary V. North American wild flowers. 2 vol. 1925.—Set of beautiful colored plates. Gift of Mrs. L. A. Frothingham.

C., T. De natuerlijcke beschryvingh der boomen. Amsterdam. 1663.

GORDON, DERMER, AND EDMONDS. A catalogue of trees, shrubs, plants, &c. sold by [them]. 1784.—Bound in crushed levant.

LAICHARDING, J. N. Manuale botanicum, sistens plantarum europaearum characteres generum, specierum differentias, nec non earum loca natalia. Oeniponte & Lipsiæ. 1794.

LE GENDRE, curé d'Henonville. La manière de cultiver les arbres fruitiers. Paris. 1652.—"Auctor verus est Antoine Le Maistre." *Pritzel.*

MASSON, Francis. Stapeliæ novæ; or, A collection of several new species of that genus, discovered in the interior parts of Africa. London. 1796.—Bound in crushed levant, with gold tooling, and having book-plate of the "Honble William Henry Irby."

MARTYN, Thomas. Thirty-eight plates with explanations, intended to illustrate Linnaeus's System of vegetables. London. 1799.

SCHELHAMMER, G. C. Catalogus plantarum maximam partem rariorum, quas per hoc biennium in hortulo domestico aluit, et, paucis exceptis, etiam his vernis aestivisque mensibus poterit exhibere. Helmstadii. 1683.

AVRIL, P. H. Voyage en divers états d'Europe et d'Asie. Paris. 1692.

THOMSON, J. A. The new national history. 3 vol. New York, *etc.* 1926.—Gift of Mrs. C. W. McKelvey.

KONING, Peter. De cortice salicis albae ejusque in medicina usu. Ex auctoritate rectoris Matthiae van Geuns. Hardervici. 1778.

KURSNER, Christian. Dissertatio medica de potu theæ. Sub praesidio J. J. Waldschmiedt. Marburgi Cattorum. 1685.

CATALOGUE des arbres cultivez dans le verger et plan du Sieur le Lectier Procureur du Roy à Orleans. 1628 (reprinted 1925).—"Privately printed. 100 copies, no. 17."

BOODT, Anselm Boëtius de. Florum, herbarum ac fructuum selectiorum icones, & vires pleræq; hactenus ignotæ. Brugis Flandrorum. 1640.

BELL, John. Travels from St. Petersburg in Russia to various parts of Asia. 2 vol. Edinburgh. 1788.—Bound in calf and having book-plates of Thomas Philip Earl de Grey.

KEATE, George. An account of the Pelew Islands. 2d ed. London. 1788.—Bound in tree calf, with engraved plates including por'rait of Capt. Henry Wilson.

[ROCK, J. F. Map of northwestern China and northeastern Tibet, made during his Arnold arboretum expedition to those countries, 1924-1927.] N.P. [1925 26.] 18 sections mounted on 3 sheets, folded in l. f° cover.—An important contribution to a new map of China and Tibet.

The number of periodicals received in exchange for the *Journal of the Arnold arboretum* now number 168, coming from all parts of the world, including Czechoslovakia, Estland, Lettland, Rumania, China, Japan, Indo-China, Siberia, Crimea, South Africa, Australia, and New Zealand. Twenty-five new exchanges have been arranged during the year.

The photographs received include fifty-three views (many aërial) taken during the "Hamilton-Rice Seventh Expedition to the Amazon,

in conjunction with the Department of tropical medicine of Harvard University, 1924–1925," the gift of Mr. Rice, and 424 more photographs taken by Mr. Rock in China, making a total of 624 received from him. Four hundred of Mr. Rock's photographs have been mounted and added to the collection, the remainder it is hoped will be added at an early date.—E. M. T.

Expedition of the Harvard Institute of Tropical Biology and Medicine to Tropical Africa.—The chief objects of this Expedition under the leadership of Dr. R. P. Strong were to make a biological and medical survey of Liberia, and then to cross Africa through the Belgian Congo emerging on the east coast of Africa, and to make comparative studies in these tropical regions. As the expedition presented an opportunity to obtain a collection of plants from tropical Africa for the herbarium, through the generosity of the late director of the Arnold Arboretum arrangements were made by him and by Dr. Strong to have a botanist accompany the expedition to collect for the Arboretum, and Dr. D. H. Linder was appointed to fill this position. Arrangements were also made with Dr. J. Bequaert, who was on the staff of the expedition and who had previously collected plants in tropical Africa, to advise and help Dr. Linder as much as his time allowed. The other members of the expedition were Doctors George C. Shattuck, Max Theiler, Glover M. Allen, Mr. Harold J. Coolidge and Mr. Loring Whitman. The expedition reached Monrovia in the first days of July 1926 and crossed the country in three different directions. Finally returning to Monrovia, it then proceeded down the West African coast to the mouth of the Congo River, and after reaching Lake Tanganyika proceeded northward as far as Lake Albert, crossing then into Uganda and British East Africa, reaching Mombasa in June, 1927. Dr. Linder collected more than 2600 numbers of well prepared botanical specimens including those collected by Dr. Bequaert and other members of the expedition. Of many of the numbers several duplicates were collected. The herbaceous plants and the fungi of the collection were turned over to the Gray Herbarium and the Farlow Herbarium.—A. R.

ERRATA

Page 21, line 7 from the bottom for **subcaudataum** read **subcaudatum.**
" 69, line 18 from the bottom *for* meritorios *read* meritorious.
" 90, line 12 FOR R. C. Ching READ *R. C. Ching.*
" 94, line 17 *for* Likau *read* Likan.
" 100, line 9 from the bottom *for* Baily *read* Bailey.
" 118, line 3 for 24643 read 2643.
" " , line 18 for **Spirea** read **Spiraea.**
" 166, line 4 from the bottom for **crenatus** read **crenata.**
" 167, line 9 for **globosus** read **globosa.**

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